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Original Communications.

TRYPANOSOME DISEASES OF DOMESTIC ANIMALS IN UGANDA.[1]

I. TRYPANOSOMA PECORUM.

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SYNONYMS.

Trypanosoma dimorphon (Dutton and Todd).
Trypanosoma congolense (Broden).
Trypanosoma confusum (Montgomery and Kinghorn).
Dr. Edington's trypanosome from Zanzibar (Bruce, Hamerton, and Bateman).
Trypanosome from Chai-Chai, Zambesi, Zululand (Theiler).
Trypanosome from Southern Rhodesia (Bevan).

INTRODUCTION.

As might be expected from the tropical nature of the country, Uganda suffers much from protozoal diseases, and as the wealth of the natives consists principally in cattle, goats, and sheep—the King and chiefs having huge herds—there is much loss.

To give an idea of the enormous mortality which must take place among the herds of cattle in Uganda, Sir Apolo Kagwa, K.C.M.G., the Prime Minister, may be quoted. He informed the

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[1] Reprinted from the *Proceedings of the Royal Society*, B, vol. 82.

Commission that during 1908 he had 1,396 cows, which had 2,021 calves, and of these calves 709 died—35 per cent. Further, of cows, bulls, and full-grown bullocks, there had died 351. This makes a total of 1,060 deaths in one year. The number of the whole herd is not given, but may be put down at 4,000. This means a yearly death-roll of about 25 per cent. During the same year the Government Transport Department in Entebbe lost 156 oxen between June and November.

During 1909 the Commission had the opportunity of investigating several outbreaks of trypanosome disease among domestic animals, one among the transport cattle at Entebbe (lat. 0° 3′ N., long. 32° 30′ E.); another at Kampala (lat. 0° 18′ N., long. 32° 35′ E.); a third at the Uganda Company's estate at Namukekera (lat. 0° 40′ N., long. 32° 17′ E.); a fourth at Mr. Walsh's farm at Kabula Muliro, a few miles west of Namukekera; and a fifth at the Mabira Rubber Estate (lat. 1° 50′ N., long. 32° 40′ E.).

The commonest trypanosome disease among cattle in Uganda is caused by a trypanosome of the *dimorphon* type, which it is proposed to call *Trypanosoma pecorum*. This species is probably the same as that which has been known by the name *T. dimorphon* (Dutton and Todd), and is either identical with, or very similar to, Broden's *T. congolense*. The name *dimorphon* is a misleading one, and can only be accounted for by Dutton and Todd describing under one name two species of trypanosomes occurring in the same animal. No one, so far as we are aware, has re-discovered Dutton and Todd's *T. dimorphon*, although many attempts to reconcile later observations with theirs have been made. Certainly the strain kept at the Liverpool School of Tropical Medicine under that name does not agree with the original description. The term *T. dimorphon* must therefore disappear, since it was born of a misapprehension. But it will at once be said, if the name *T. dimorphon* must go, why not call the species *T. congolense*? The only reasons that can be given are, that *T. congolense* is a local name and, therefore, not very suitable, and secondly, that if it comes to strict priority, then *T. dimorphon* holds the field in spite of its misleading character, and the error its authors fell into, because it cannot be denied that there is a strong feeling that *T. dimorphon* and *T. congolense* are one. At the same time it must also be granted that there are others who are strongly of opinion that *T. dimorphon* and *T. congolense* are distinct species. Under these circumstances it seems best to unite the old names under a new one, and *T. pecorum* seems appropriate enough, as this trypanosome disease is peculiarly one of herds. Montgomery and Kinghorn have lately proposed the name *confusum*, in order to get out of the difficulty; but this name has been used for a trypanosome already, and it is, moreover, an awkward term.

It must then be understood that in the species *T. pecorum* we include *T. dimorphon*, *T. congolense*, the trypanosome discovered in Zanzibar by Edington and described in the *Proceedings*,[1] that from Portuguese East Africa and Zululand described by Theiler, and the species found in Northern Rhodesia by Montgomery and Kinghorn, and in Southern Rhodesia by Bevan.

The other species of trypanosomes found in the blood of cattle in Uganda were *T. gambiense*, *T. brucei*, *T. vivax*, *T. cazalboui*, and *T. nanum*. These names, however, may require to be reconsidered.

DISTRIBUTION IN UGANDA.

Cattle suffering from *T. pecorum* were sent to the Sleeping Sickness Commission's laboratory at Mpumu from Entebbe, Kampala, Namukekera, Kabula Muliro, and Mabira. It is probably widely distributed throughout Uganda. It was also found in a horse which had arrived in Nairobi, British East Africa, from Abyssinia. The Commission is indebted to Mr. Stordy, Principal Veterinary Officer, for the opportunity of studying this trypanosome. It is not known where the horse became infected, but it must have been at some point between Nairobi and the Abyssinian border.

MORPHOLOGY OF *Trypanosoma pecorum*.

A. *Living, Unstained.*

This trypanosome, when observed in a preparation of fresh blood, is seen to remain at or near the same spot in the field, that is to say, it is non-translatory. It is, however, active and restless, the body quivering rapidly, and the undulating membrane and flagellum keeping up a constant vibratory motion. As a rule, it moves with the flagellar end in front. The contents of the cell are homogeneous, except for a vacuole at the posterior extremity.

A marked characteristic of this species is that it exhibits alternating periods of quiescence and activity. When quiescent it is usually invisible, as it has a habit of burying itself under small collections of red blood corpuscles.

B. *Fixed and Stained.*

Method of Staining.—Giemsa's method, as described in a former paper,[2] was used.

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[1] B, vol. 81, p. 14.

[2] *Roy. Soc. Proc.*, B, vol. 81, p. 16.

Length.—The same method of measuring was used as described in the same paper.

Breadth.—Without the undulating membrane the average is about 2 microns, with the membrane about 3 microns.

Shape.—This trypanosome when stained is short and stout in form. The posterior extremity is blunt, or rounded, or pointed and angular. The anterior end is narrower. The undulating membrane is fairly well developed, more so, perhaps, than in *T. nanum.* The flagellum arises near the micronucleus, and passes along the edge of the undulating membrane. There is no free flagellum.

Contents of Cell.—Generally homogeneous. Sometimes granules are seen which take on a chromatin stain, and are situated anterior to the nucleus.

Nucleus.—Is oval in shape, and situated about the middle of the body.

TABLE I.—*Trypanosoma pecorum.*

No. of experiment	Animal	Day of disease	Method of fixing and staining	In Microns		
				Average length	Maximum length	Minimum length
82	Ox	..	Osmic vapour and Giemsa	11·7	14·0	10 0
505	,,	42	,,	12·3	15·0	10·0
	,,	..	,,	13·2	15·0	11·0
593	Sheep	50	,,	14·5	17·0	10·0
44	Monkey	31	,,	12·2	14·0	10·0
559	,,	14	,,	12·7	16·0	11·0
461	Dog	44	,,	15·3	18·0	13·0
543	,,	10	,,	14·3	16·0	11·0
1,406	,,	31	,,	13·7	16·0	11·0
551	Rat	19	,,	12·6	18 0	8·0
626	,,	..	,,	12·8	15·0	10·0
398	Mouse	28	,,	14·6	16·0	13·0
398	,,	36	,,	13·1	17·0	10·0
			Average ..	13·3	16·0	10·6

Micronucleus.—Small and round, and situated near to, but not at, the posterior extremity.

Undulating Membrane.—Is simple, but fairly well developed.

Flagellum.—There is no free flagellum. In very rare cases, where there is an appearance of a free flagellum, the trypanosome will be found to be dividing.

As will be seen from this tabulated statement, the disease set up in domestic animals by *T. pecorum* is a serious and fatal one.

Cattle, goats, sheep, monkeys, dogs, rats, and mice are susceptible. Guinea-pigs, on the other hand, are refractory. Horses, mules, donkeys, and rabbits were not available at Mpumu; so that, unfortunately, it is not possible to say whether they are inoculable or not. In regard to guinea-pigs it would be interesting to know whether a series of inoculations into rats or rabbits would make the *T. pecorum* also pathogenic for them.

TABLE II.—ANIMALS SUSCEPTIBLE TO *Trypanosoma pecorum*.

No. of experiment	Source of virus	Period of incubation, in days	Duration of disease in days*	Remarks
			Cattle.	
82	Natural infection	?	2	Died 2 days after arrival.
110	,, ,,	?	243	Treated with lithium antimonyl tartrate.
230	,, ,,	?	4	Died 4 days after arrival.
357	,, ,,	?	3	,, 3 ,,
358	,, ,,	?	1	,, 1 day after arrival.
359	,, ,,	?	60	Treated with arsacetin.
360	,, ,,	?	14	Died of *Trypanosoma pecorum*.
391	,, ,,	?	313	,, ,,
475	,, ,,	?	9	Died 9 days after arrival.
476	,, ,,	?	2	,, 2 ,, ,,
477	,, ,,	?	13	,, 13 ,, ,,
482	,, ,,	?	5	,, 5 ,, ,,
483	,, ,,	?	34	,, 34 ,, ,,
505	,, ,,	?	265	Killed.
550	,, ,,	?	—	Treated with arsenic; still alive after 254 days.
1459	,, ,,	?	43	Died 43 days after arrival.
1560	,, ,,	?	46	,, 46 ,, ,,
1731	,, ,,	?	79	Killed.
1733	,, ,,	?	76	Died 76 days after arrival.
1735	,, ,,	?	79	Killed.
1736	,, ,,	?	79	,,
1737	,, ,,	?	84	Died of *T. pecorum*.
97	Ox	9	46	,, ,,
447	,, ...	8	287	Killed.
1463	,, ...	7	35	Died of *T. pecorum*.
1464	,, ...	7	14	,, ,,
1225	Monkey	—	—	Died 8 days after inoculation; bitten by snake. Never showed trypanosomes.
1357	Dog	6	15	Died of *T. pecorum*.
1358	,, ...	6	18	,, ,,
1359	,, ...	6	22	,, ,,
1363	,, ...	6	15	,, ,,
1364	,, ...	6	38	,, ,,
1365	,, ...	6	29	,, ,,
	Average	6·7	63	
			Goat.	
1005	Ox	—	—	Never showed trypanosomes; still alive after 72 days.
1006	,, ...	14	44	Cause of death doubtful.
1404	,, ...	9	41	,, ,, ,,
1405	,, ...	—	—	Never showed trypanosomes; under observation 31 days.
633	Monkey	12	51	Cause of death doubtful.
	Average	11·6	45	

Duration includes the days of incubation; it dates from the day of infection.

TABLE II.—ANIMALS SUSCEPTIBLE TO *Trypanosoma pecorum*.—*Continued.*

No. of experiment	Source of virus	Period of incubation, in days	Duration of disease, in days*	Remarks
				Sheep.
697	Ox	21	—	Still alive after 170 days.
632	Monkey	8	43	Cause of death doubtful.
593	Dog	19	168	Died of *Trypanosoma pecorum*.
	Average	16	105	
				Monkey.
44	Ox	14	35	Died of *T. pecorum*.
49	,, ...	10	16	,, ,,
376	,, ...	11	56	,, ,,
683	,, ...	10	61	,, ,,
1740	,, ...	11	—	Still alive after 45 days.
719	Sheep	21	-	,, ,, 216 ,,
350	Monkey	10	181	Died of *T. pecorum*.
459	,, ...	6	80	,, ,,
1000	,, .. .	16	45	,, ,,
460	Dog	11	75	Killed for cultivation experiments.
559	,, ...	12	39	Died of *T. pecorum*.
560	,, ...	14	32	,, ,,
581	Rat	13	86	,, ,,
	Average	12·3	64	
				Dog.
543	Horse	9	26	Died of *T. pecorum*.
148	Ox	10	46	,, ,,
349	,, ...	22	98	,, ,,
552	,, ...	—	—	Re-injected after 17 days.
1007	,, ...	-	—	Found dead after 14 days.
1406	,, ...	21	29	Killed.
1407	,, ...	—	--	Died ; under observation 31 days.
1193	Monkey	8	16	Died of *T. pecorum*.
433	Dog	7	44	,, ,,
434	,, ...	9	58	,, ,,
461	,, ...	6	40	,, ,,
1544	,, ...	10	21	,, ,,
552	Rat	—	—	Still alive after 49 days.
	Average	11·3	42	
				Guinea-pig.
685	Ox	—	—	Still alive after 96 days.
1162	,, ...	—	--	,, ,, 36 ,,
1163	,, ...	—	—	,, ,, 36 ,,
1164	,, ...	—	—	,, ,, 36 ,,
1647	,, ...	—	—	Died ; under observation 29 days.
628	Monkey	—	—	Still alive after 104 days.
1002	,, ...	—	—	,, ,, 50 ,,
566	Dog	--	—	,, ,, 78 ,,

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* Duration includes the days of incubation ; it dates from the day of infection.

TABLE II.—ANIMALS SUSCEPTIBLE TO *Trypanosoma pecorum*.—*Continued.*

No. of experiment	Source of virus	Period of incubation, in days	Duration of disease, in days*	Remarks
		White rat.		
397	Ox	17	39	Died of *T. pecorum.*
551	,,	16	18	Killed for cultivation experiments.
684	,,	16	32	Died of *T. pecorum.*
699	,,	—	—	Experiment stopped after 57 days.
1646	,,	12	16	Died of *T. pecorum.*
626	Monkey	12	22	Killed for cultivation experiments.
1001	,,	13	23	Died of *T. pecorum.*
455	Rat	9	12	,, ,,
729	,,	11	21	,, ,,
1708	,,	8	12	,, ,,
	Average	12·6	21	
		Mouse.		
686	Ox	—	—	Experiment stopped after 59 days.
398	Monkey	26	41	Died of *T. pecorum.*
627	,,	12	26	,, ,,
454	Mouse	6	12	,, ,,
	Average	14·7	26	

* Duration includes the days of incubation, it dates from the day of infection.

Theiler describes a trypanosome from Chai-Chai, near the mouth of the Limpopo, in Portuguese East Africa, from the mouth of the Zambesi, and also from Zululand, which resembles the one under discussion, in not infecting guinea-pigs, and considers that this one fact is sufficient for the creation of a new species. We cannot agree with him in this, as there is no practical importance, except in the laboratory, in the fact that the guinea-pig is insusceptible, and, moreover, until more experiments have been made, we cannot be sure that under certain conditions of dosage or passage through the smaller animals the guinea-pig will remain refractory.

The important facts in regard to this species are, that man is not susceptible, but that the valuable domestic animals are, and that in these animals the disease is, as a rule, a fatal one.

As long as our knowledge of trypanosomes is limited it seems better to group them under as few names as possible. As knowledge grows, and as fundamental differences emerge, then it will be time to define them more strictly. As far as our present knowledge goes, the morphology of *T. dimorphon*, *T. congolense*, the Uganda, Zanzibar, Chai-Chai, Zambesi, Zululand, and Rhodesian strains is identical; these trypanosomes affect the same important domestic animals; the carrier is probably or may be the same, though this is not known, and therefore these various forms should, for the present, be grouped under one name, and for certain reasons given above we propose the name *T. pecorum* for this group.

Disease set up in Cattle by Trypanosoma pecorum.

It is unnecessary in this paper to describe in detail the symptoms which can be noted during life, or the pathological changes set up in the organs of cattle by this trypanosome. It will be sufficient to say that the main symptoms are emaciation, anæmia, and progressive weakness, and that the principal post-mortem appearances are those due to anæmia.

Incubation.—As is probably true of most trypanosome diseases in susceptible animals, the period of time which elapses between the infection of the animal and the appearance of the trypanosomes in sufficient numbers in the peripheral blood to be seen by the microscope is a short one, in this case an average of 6·7 days.

Duration.—Of the course and duration of this disease in cattle little, unfortunately, is known. Most of the cattle which came under observation at the laboratory of the Commission at Mpumu were already sick when they arrived, and it was, as a rule, impossible to know when they had been infected. By referring to the table it will be seen that twenty-two naturally-infected cattle were under observation. Four of them lived, on an average, nine months. Of these four, one, treated with arsenic, was still alive and apparently healthy in December, 1909, one was killed, one had been treated with lithium antimonyl tartrate, and one died without treatment at the end of 313 days. It is therefore impossible to say from the insufficient data at our disposal whether spontaneous cure ever takes place in this disease in cattle.

When we turn to the cases of cattle which were inoculated on the hill, and were therefore under observation from the beginning, we are struck by the rapid course of the disease. One animal certainly lived 287 days, but the remainder died, on an average, in twenty-six days from the date of infection. Most of these oxen were inoculated with a strain of this trypanosome, which had caused a rapidly fatal epidemic among a herd of milch cattle belonging to Mr. Walsh, at Kabula Muliro. In the short space of one month twenty-four of Mr. Walsh's cattle died, and in two months thirty-four had died out of a herd of about 300 head.

It may therefore be concluded that *T. pecorum* sets up a rapid and fatal disease in cattle.

Disease set up in Goats and Sheep by Trypanosoma pecorum.

The number of cases of this disease in goats and sheep which came under observation is too small to draw any conclusions from. At Mpumu the goats and sheep were not satisfactory experimental animals, as many of them died from some unknown cause. It was thought that as these animals usually lived in the valleys, and were often housed in their owner's hut during the night, the exposure on the top of the hill had a bad influence. One sheep was still alive after 168 days, and it is probable that most of the goats and sheep would have lived much longer if they had been kept under more favourable conditions.

Disease set up in the Smaller Laboratory Animals.

It is not necessary to describe in detail the action of *T. pecorum* on the monkey, dog, and smaller laboratory animals, as a reference to the table will show the average periods of incubation and duration. It will be seen that this is a fairly rapid and fatal disease in the dog, white rat, and mouse. In the monkey the average duration is about two and a-half months.

THE CARRIER OF *Trypanosoma pecorum.*

Glossinæ.—From experiments made in the laboratory at Mpumu, it seems probable that *Glossina palpalis* is capable of acting as a carrier of this trypanosome. Four experiments were made with ordinary wild Lake-shore flies, and of these one was successful. Four were also made with laboratory-bred flies, and one again came off. The latter experiment, however, with laboratory-bred flies, was not free from doubt; but from the other, which seemed free from doubt, it appears that *T. pecorum* can develop in *G. palpalis*, and infect a healthy animal after a period of twenty-one days. More observations are required. It may be noted that in no instance did *T. pecorum* appear in the blood of animals upon which freshly-caught Lake-shore tsetse flies had been fed. These flies were found to be naturally infected with *T. gambiense* and *T. vivax*. This is an argument, though a small one, that *G. palpalis* is not the common or chief carrier of *T. pecorum.*

Tabanidæ.—There is some circumstantial evidence available to show that *T. pecorum* is carried by the *Tabanidæ.* In the valleys round Mpumu Hill, so far as we are aware, there are no tsetse flies at any time of the year. As a rule, there are a few *Tabanidæ.* The cattle belonging to the Commission went down to the foot of the hill every morning to graze, and returned to their kraal on the top at sunset. Half of the herd went to the east of the hill, and half to the west. On both sides there was a small valley or glen, through which ran a small stream. In these valleys during the year, as a rule, a *Tabanus* or two or a *Hæmatopota* could be seen, but they were in small numbers. Now it is a curious fact that at certain times of the year enormous numbers of *Tabanidæ* will suddenly appear in places where only a few are, as a rule, to be found. For example, Mr. Brown, at Mabira, who was collecting the biting flies of his district, wrote on March 14, 1909, that the *Tabanidæ*, which for months had been scarce, were then swarming everywhere in countless numbers, and he afterwards wrote that this invasion lasted about a month. The particular species which appeared at Mabira at this time was *Tabanus socialis* (Walk.).

So, in the same way, at Mpumu, the *Tabanidæ*, which had been rare, suddenly appeared in swarms. They were first seen in the valley to the west of the hill in September, 1909, and a month later in the valley to the east. Soon after this the cattle which had shown no signs of disease during the previous year were found to be suffering from *T. pecorum*. Those which grazed in the valley to the west were the first to be affected, and afterwards those which grazed to the east of the hill. The species of *Tabanidæ* in this case was *Tabanus secedens* (Walk.). In both groups of cattle there were cases of *T. pecorum* disease, so that the *Tabanidæ* had a reservoir from which to draw the virus.

Another sudden epidemic of *T. pecorum* disease occurred on Mr. Walsh's farm at Kabula Muliro, where, as stated above, thirty-four milch cattle died within two months in a herd of 300. The evidence is all against this epidemic having been caused by tsetse flies. During February and March, and again later in the year during August and September, as many as 100 fly-boys were engaged scouring this district for biting flies. *Tabanidæ*, *Hæmatopota*, and *Chrysops* were brought in, but not a single tsetse, although a reward of 5 rupees was offered for each specimen. The commonest *Tabanus* in this district during August was *varietus* (Walk.).

It may, therefore, in our opinion, be concluded that the trypanosome disease caused by *T. pecorum* can be carried from sick to healthy animals without the aid of *Glossinæ*, but what other species of fly, if any, acts as carrier is merely a matter of speculation at present.

Stomoxys.—Montgomery and Kinghorn state that they have strong evidence against this genus. At Mpumu several experiments were made to attempt to settle this question, but although they were persevered in for months, they remained negative. *Stomoxys* are so numerous in every part of the country all the year round that it seems inconceivable that they can act as carriers. From October, 1908, until the following September, although numerous cases of cattle with *T. pecorum* in their blood grazed all day long with healthy cattle, yet not a single case of infection took place. The *Stomoxys* were exceedingly numerous all this time, forming a small cloud of flies round the cattle, and passing constantly from one animal to another, being driven hither and thither by the rapidly-swishing tails. This is a natural experiment on a large scale.

It will therefore require very convincing proof to bring this Commission to the belief that *Stomoxys* are carriers of this disease.

The subject of the carrier of *T. pecorum* must remain in this unsatisfactory state for the present, but it is hoped that experiments which are at present being carried out at Mpumu may throw some light on this important part of the subject.

CULTIVATION OF *Trypanosoma pecorum*.

One difficulty experienced at Mpumu in attempts to cultivate the various trypanosomes was that rabbits were not available to supply the blood for Novy and MacNeal's medium. The blood of rats, goats, and oxen was used; but in making the cultivation of trypanosomes a factor in their diagnosis uniformity must be of the first importance.

Another difficulty was the frequency of contamination of the tubes. This was, perhaps, to be expected in a laboratory on the top of a hill in the Tropics, with very free ventilation.

T. pecorum grows fairly readily on blood-agar medium. At the end of twenty-four hours clumps may be seen containing many trypanosomes, with their flagellar ends directed outwards and in active motion. The individual flagellates have irregularly-shaped granules of chromatin scattered through their body substance, and also many brightly-refractile vacuoles. After forty-eight hours' culture every field contains many active trypanosomes, and also small clumps composed of ten, twenty, or more members.

After six days the trypanosomes are still very active; they vary much in size and shape, from the plasmodial to the elongated, flagellated, highly active trypanosome. After this they seem to degenerate, and in a few days living trypanosomes can no longer be found in the tube.

This description approaches to some extent that of the cultural characters of Dr. Edington's trypanosome from Zanzibar and *T. dimorphon,* but there is not that extraordinary growth which was described as covering several fields of the microscope. Whether this was due to the difference in the composition of the blood medium, or to the higher temperature at Mpumu, it is impossible at present to say.

CONCLUSIONS.

(1) *T. pecorum* is an important trypanosome disease of domestic animals in Uganda.

(2) It is similar in morphology, action on animals, and cultural characters to the *T. dimorphon* described by Laveran and Mesnil, and to Dr. Edington's trypanosome from Zanzibar, described in the *Proceedings,*[1] except that *T. pecorum* is not pathogenic to guinea-pigs.

(3) The carrier is unknown, but is probably a *Tabanus,* and not *Stomoxys.*

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[1] B, vol. 81, p. 14.

THE LIFE-HISTORY OF THE PHLEBOTOMUS.

By CAPTAIN P. J. MARETT.
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IN a preliminary paper published in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, September, 1910, on the breeding places of the sandfly in Malta, reference was made to the finding of larvæ and pupæ under natural conditions in walls, in embankments, in caves, in crevices, in bastions; in fact, in any place where there is a sufficient supply of moisture and nourishment, where it is dark and where the insect can pass through its preliminary stages without disturbance.

If it were not for the fact that time is a great factor in the propagation of the Phlebotomus (the development from egg to imago taking in all probability about three months), it is quite likely that the fly would be a far greater nuisance than it is at present.

In attempting a description of the life-history of the Phlebotomus, it has been thought best to describe it under the following headings: Breeding experiments, Life-history, Egg, Larva, Pupa, Imago, Preventive Measures for Breeding, Preventive Measures for Lowering the Incidence of Fever.

BREEDING EXPERIMENTS.

As the result of microscopical examination of the detritus and observations on a woodlouse and lizards, it became apparent that their excreta to a great extent form the detritus on which the larvæ live.

Till this was known, all attempts at breeding had been failures; on rare occasions a fly had been known to lay its eggs in a test tube, but these were practically always in a mass. It now seems likely that these flies were captured whilst laying in nature, and that they merely completed the act in a test-tube.

It is hardly necessary to do more than touch on the breeding experiments carried out previous to this: the attempts were many and varied, and even went so far as the building of miniature walls in flyproof cages. The examination of their contents was, however, too tedious to be of any use, and was discontinued in favour of test-tube propagation, which was carried out as follows:—

A test-tube was rinsed out with water to moisten the sides, sufficient fresh detritus to cover one side and to allow of some at the bottom of the test-tube was then introduced. About 75 per cent of these experiments were successful and breeding in this manner was carried out as a routine, six tubes being put up at a time. Under these conditions eggs when present can be found with the aid of a lens.

In the majority of experiments, flies which had previously paired were used, but in some it was possible to catch the couple when paired. With captive flies, pairing may be to a certain extent artificial; at any rate with these as often as not the female had had a meal of blood. In the few instances in which flies have been captured in the act of pairing, they have never been found to have fed on blood. This description therefore applies to captive flies.

The female when full of blood is heavy and does not move about much. The male alighting close to her, approaches by short jumps, continually waving the posterior segments of the abdomen from side to side, with a lashing movement. When sufficiently close and settled to one side and in rear, he suddenly seizes the posterior portion of the female's abdomen with his claspers. In doing so he has to wheel round; they are then joined with their heads facing in opposite directions. Copulation takes place for ten to fifteen minutes. If the pair be disturbed during this time the female, being the larger and stronger, flies about or drags the male after her.

After pairing the flies were kept in a prepared test-tube, the mouth of which was closed with a plug of cotton wool. During pregnancy females will, if allowed, feed daily, but it was found best to feed them two or three times previous to parturition, *i.e.*, whenever they were found to have got rid of all blood. When flies feed daily, the different colours in the abdomen are distinctly marked off into three zones, the proximal portion full of blood appearing bright red, the central portion occupied by clotted or half-digested blood being black, and the distal segments containing the rapidly enlarging ovaries being of a dull white colour.

The duration of pregnancy is from eight to ten days, as is seen by the following experiments :—

	Date of pairing		Date of laying of eggs		
1.–	August 11, 1910	..	August 19, 1910	=	9 days.
2.—	,, 20, ,,	..	,, 27, ,,	=	8 ,,
3.—	,, 20, ,,	..	,, 27, ,,	=	8 ,,
4.—	,, 22, ,,	..	,, 31, ,,	=	10 ,,

The male frequently survived the female, and it would appear that the male lives longer than its mate.

After the eggs were laid, care was taken to keep the test-tubes moist by the daily addition of a drop or two of water and by wetting the cotton wool plug. Under these conditions the eggs hatched out in from six to nine days.

The following table shows the results of a few experiments :—

Paired	Eggs laid	Larvæ hatched	Time
August 11, 1910	August 19, 1910	August 26, 1910	8 days.
,, 16, ,, (put up)	,, 19, ,,	,, 27, ,,	9 ,,
,, 20, ,,	,, 27, ,,	Sept. 4, ,,	9 ,,
,, 20, ,,	,, 28, ,,	,, 5, ,,	9 ,,
,, 25, ,, (put up)	,, 28, ,,	,, 3, ,,	6 ,,

Where the tube was kept moist, but the plug was allowed to dry, the eggs took longer to hatch out, as in the following experiment :—

Paired	Eggs laid	Larvæ hatched	Time
August 22, 1910	August 31, 1910	Sept. 12, 1910	13 days.

Where both the tube and the plug were allowed to get somewhat dry, the time taken was even longer, thus :—

Eggs laid	Moistened	Larvæ hatched	Time
August 9, 1910	August 28, 1910	August 29, 1910	20 days.
,, 16, ,,	,, 28, ,,	,, 29, ,,	14 ,,

From this it would appear that in dry weather, so long as the eggs do not shrivel up, they will retain their vitality and will rapidly hatch out on the onset of damp weather. In damp sirocco weather the fly is far more in evidence, and, as will be seen, its activity is greater in all stages when the air is moist.

In any batch the eggs do not all hatch out at the same time. The longest period for individual eggs has not been worked out, but young larvæ have been frequently found among specimens of a much greater age.

When larvæ were seen in a tube they were removed to Petri dishes. The test-tube was gently washed out with tap water, and the debris filtered through ordinary filter paper, which had been cut to fit a Petri dish. In the washing-out process, the detritus being heavier fell to the bottom, whilst the larvæ floated. The result was that they were found lying on the top of the detritus or on the filter paper. The paper was then rapidly deprived of as much water as possible by placing it on folds of filter paper. If the paper was allowed to remain moist, the larvæ being small were unable to crawl about and were drowned. Those which appeared adherent to the paper were carefully picked out under the dermatoscope and placed on pieces of detritus.

As soon as the larvæ had recovered from the washing-out process, additional detritus was placed in the dishes, the more the better, except that larvæ were apt to be lost sight of. A piece of filter paper fitting into the upper half of the Petri dish was kept constantly damp, thereby ensuring a saturated atmosphere and darkness. At night the lids were placed so as to only partially cover the dishes. So long as the atmosphere was saturated with moisture and the detritus was damp, larvæ throve, but with excess of moisture they were drowned, and when the detritus dried they were unable to feed and death also resulted.

When, owing to pressure of other work, the Petri dishes (some containing larvæ fifty-three days old) became dried up, it was found that in seeking for moisture the larvæ had found their way beneath the layers of filter paper. Probably therefore in nature, as the superficial detritus dries they go deeper into the debris.

Attempts at breeding with earth instead of the detritus were failures; it therefore appears that they do not breed in ordinary earth.

The temperature in the interior of walls, etc., and in the workroom where breeding was carried out varied from 72° F. to 88° F.

LIFE-HISTORY.

The seasonal prevalence varies somewhat, but the earliest flies are found in places which are sheltered from wind and rain; and in such spots they can still be found when they have disappeared from more exposed places. In 1910 flies first appeared about the middle of May, that is, about two to three weeks after the termination of the rains. They gradually increased until in June they were to be found in large numbers. During July, when the weather was very hot, they once more became scarce, and were only in evidence again on the onset of the sirocco weather, about the middle of August or beginning of September. They then appeared in far greater numbers than earlier in the year, and remained till about the middle of November, when their disappearance was due to the onset of the winds and rains. In other years their seasonal prevalence was much the same as in 1910.

From the above, and from breeding experiments, it would appear that it is in the larval stage that the insect hibernates.

In all probability many larvæ are killed by the rains, as it is a frequent occurrence for walls to be broken down by the heavy rains. When the rains cease, the surviving larvæ pupate, and as the pupal instar has a duration of eleven to sixteen days, this period agrees with the time above stated for the appearance of the fly on the cessation of the rains.

During the early summer the first flies lay eggs, and these probably furnish the large number of flies which appear in the later months.

The scarcity of the fly during the hot months is, in all probability, due to the short length of life of the fly.

No experiments with reference to flooding breeding grounds in summer have been carried out, as it would have required an outlay of more money than was available.

THE EGG.

Extrusion, Situation, Substance, Changes undergone in Maturation, Number, Size, Figure, Colour, Period of Hatching, and Fracture of Egg.

Extrusion.—Eggs are at first laid singly, or in pairs dotted here and there on the glass, and are attached by a viscous-looking substance, which is secreted by a pair of glands situate in the posterior segments of the abdomen. This secretion probably helps to keep the eggs from drying. After fifteen to twenty eggs have thus been laid, the remainder, with the exception of one or two, to be mentioned later, are laid in a mass, together with, at times, the contents of the intestinal tract. The fly, whilst passing this mass, appears to be overcome by her exertions; with legs fully spread, she crouches low, and occasionally lies on her side. She usually dies immediately after, being too weak to pass one or two eggs, which are retained, and which are invariably to be found in the dead body of the insect.

The time taken in laying probably extends over twelve hours. A fly observed laying in the morning was caught in the same place in the afternoon, and, on examination, was found to contain fifteen eggs, which would shortly have been laid in a mass.

Where flies have died in captivity, without laying eggs, it has been found that by gently pressing on the abdomen, the eggs escape adhering to each other, the first having the second on its right, whilst the third adheres to the left of the second, and so on, probably showing that the eggs come alternately from the right and left oviducts. It has been possible to ascertain that of eggs thus expelled, some are fertile.

Situation of Egg.—In nature the female has been observed, when on detritus, from time to time lowering her head, and with her proboscis boring a hole by turning from side to side, thus describing an arc of a circle. Having accomplished this, she steps over the hole, and inserts her posterior extremity, the ovipositor probably dropping an egg in the act. Flies have been seen thus engaged on the soft stone wall of rooms. Careful examination has failed to show the presence of eggs, but one hardly expects to find so minute an object in such a position.

In test tubes, where the egg can be seen, they are laid, as a rule, in the upper portion of the tube, dotted about, the mass of eggs being found near the dead fly. The full complement of eggs is never to be seen. Those which are visible are generally laid near a piece of detritus, which contains a certain amount of moisture. A female, on more than one occasion, has been seen progressing slowly with an egg held in its ovipositor, which she has dropped on coming into contact with a small object.

Substance.—The shell, which at first is opalescent white, quickly changes to a light brown. The surface of the egg is reticulated. These sculpturings, under a high power, are seen to be composed of well-defined longitudinal lines, with irregular and ill-defined transverse markings.

If the egg be allowed to dry, it shrivels up, owing presumably to a rapid evaporation of its contents. (See fig. 1).

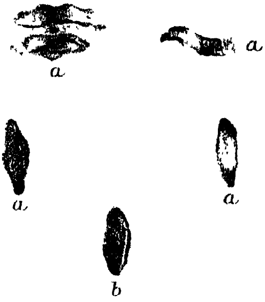
When placed in too moist a situation, it enlarges, becomes black and glistening, and the reticulated pattern is lost, owing to the swollen condition of the integument. Such eggs occasionally attain maturity, and have been seen with the black larval head protruding, but the larvæ have not been seen to escape from the egg shell. The body of the embryo has the appearance of a colloidal substance, and is swollen beyond recognition.

Eggs which have been allowed too much moisture flatten out on drying and become boat-shaped. They are then leathery, and can be doubled up without breaking.

When the shell is burst by the larva, it is brittle, and a well-marked fissure is to be seen. This phase is shown in fig. 2.

Changes undergone during Maturation.—The contents at first appear to be fluid, and have no structure. Within twenty-four hours rosette-shaped bodies are seen, which are massed in the centre, these gradually assume a definite longitudinal arrangement along one side of the egg, and can finally be made out to consist of the segments of the future larva. This rosette formation is well advanced when the eggs are laid.

Number.—The average number of eggs is thirty to thirty-five, and at present no great variation in numbers for different species has been noted. The largest number counted in a single female was forty, but as she died without passing them, and looked so distended, it was quite possible that death was due to the excessive number.



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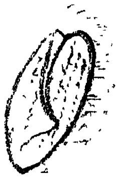

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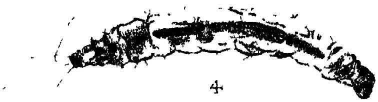

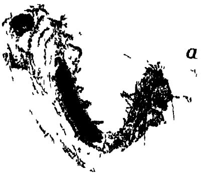

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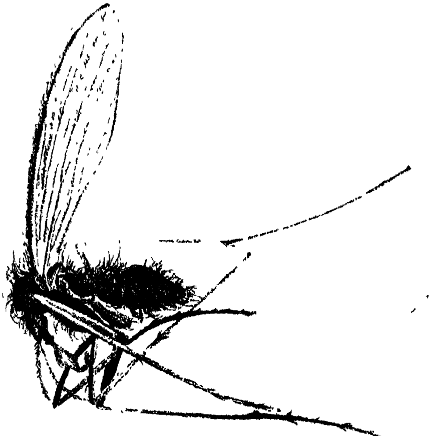

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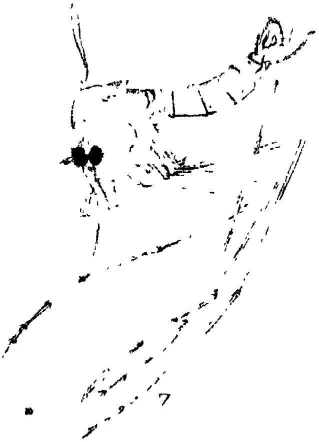

Fig 1 Eggs.
(*a*) Distorted (*b*) Swollen.
,, 2. Egg shell showing fracture.
,, 3.—Larva under 15 days old.

Fig. 4. Larva over 15 days. Age 35 days.
,, 5.—Pupa (*a*) substance from stone surface
,, 6. - Phlebotomus ♀ black variety.
,, 7.- Phlebotomus ♂

To illustrate paper by Captain P. J. Marett, R.A.M.C., on "The Life History of the Phlebotomus."

The enumeration of eggs has been carried out in all instances in the body of the fly, shortly before laying would occur. It is an impossibility to count the number of eggs once they are laid, as they are so easily overlooked. In test-tubes frequently only a few eggs could be seen, yet as many as fifteen larvæ were obtained, without all the visible eggs having hatched out.

Size.—The average length of the egg is 36 μ, and the breadth 12 μ. In the report on the breeding places, the Indian measurements were quoted. These eggs are larger, and their size probably accounts for the smaller number produced by these species. The eggs from one female are all identical in size, but the size varies slightly in different individuals.

Figure.—In form they are cylindrical, rounded at both ends, and are slightly curved longitudinally. This curvature, on careful examination, appears to be a convexity on one side, with an approximately straight surface on the opposite side, this being the one by which it adheres.

LARVÆ.

The phlebotomus larva belongs to the cruciform type of larvæ, its distinguishing features being an absence of true legs on the anterior segments of the body and the presence of caudal hairs. The Y-shaped mark on the dorsal aspect of the head noted by the Indian entomologists, however, is not invariably present.

On hatching, the larva is white and translucent; but in a very short time the head and caudal hairs become black and shiny, and the body takes on a light sandy colour, finally becoming grey with age.

Shape.—The body of the larva is divided into thirteen segments consisting of the head, three thoracic and nine abdominal segments.

The head is very distinct, highly convex above, but flatter beneath. The mouth-parts are placed at the distal extremity on the ventral surface. Viewed laterally, the head is seen to be composed of two parts; an anterior one-third consisting of the mouth-parts, and a posterior two-thirds which is covered with rugosities.

The neck is distinct, and much resembles a collar.

The twelve abdominal segments are difficult to count owing to the deep folds of the skin; in practice it is only by counting the rows of dorsally placed body spines that one is able to determine the exact number.

Appendages of the Head.—There are no eyes. The mouth-parts were not dissected out, nor were sections made; they are covered by strong shields, one pair laterally, and one single dorsal, and one single ventral. These are strong and firm at their base, gradually becoming thinner and weaker at the extremities, which are pectiniform. The internal mouth-parts consist of two dorsal, two ventral, and a central portion.

Posterior to the mouth-parts on the dorsal aspect are placed the antennæ, two stout, short, and flattened rods which curve forwards, the length being about half, and thickness about three times that of the body hairs.

Appendages of the Body.—There are no true legs. The first two segments are free of prolegs, the next have three small prolegs, or sucking discs (so called by Grassi). The next four have large prolegs.

The under surface of the last segment has a large oval proleg, which when fully extended is seen to be bifurcated. This is only to be seen in living specimens under special circumstances. In mounted specimens the prolegs retract, and are hard to count.

Spines.—Those on the head and body are similar, and are placed singly and in rows. The body spines occur on all the abdominal segments, two in the centre of the latero-ventral surface, and four on the latero-dorsal surface, at the junction of one segment with the next. The spines are broadly dilated at their extremities, and are themselves fringed with minute hairs; they are longer on the dorsal than on the ventral surface, and arise from papillæ on the posterior border of each segment.

Tail-hairs.—These are long, thin, black, glistening hairs growing from processes situated at the end of the last segment. For the first fortnight of larval life they are two in number, one from each process. Afterwards they are four in number, two from each process. The last segment and the above processes are of the same colour as the hairs. The hairs vary in length with the age of the larvæ. Taking the length of the body as unity, the following table gives the proportionate length of the caudal hairs:—

Age of larvæ	Length of caudal hairs
2 days	1·21
7 ,,	0·96
12 ,,	0·5
14 ,,	0·525
24 ,,	0·352
35 ,,	0·514

There are also some small spines present on the last segment. They are usually directed at right angles to the caudal hairs, and in form much resemble the body hairs.

Movements.—Progression is as follows: With the mouth-parts it seizes an object, thus pulling itself forward, till the anterior prolegs are brought as far forward as possible, then the posterior prolegs are brought up to the anterior ones, thus forming a loop. By repeating this process it advances at a good rate. From time to time it raises its body, till it appears to bo standing on its head; it is when it is in this position that one is able to see the bifid nature of its anal proleg, which is then fully extended, and the caudal hairs are taken well to the front. This latter movement appears to be carried out for the purpose of feeling the way.

The caudal hairs are at first dragged behind, but very soon they are carried at right angles above the body, in a fan shape.

Movements of the Mouth-parts.—The buccal organs work together with a flicking movement, they dart out and seize the nearest object. The head movements much resemble those of a snake when striking.

Habitat with Reference to Movements.—The larvæ creep up under detritus, and will lie almost motionless feeding for days when the surroundings are favourable, but excess of moisture will cause them to begin to crawl about.

Food Supply.—The detritus, which appears to consist of wood-louse and lizard excreta, is the chief food supply. At birth larvæ will also eat the hairs off the body of the dead fly. They are also cannibals, two or three attacking a weak one, and devouring all but the caudal hairs.

Process of Moulting.—A larva which hatched on July 30th, 1910, underwent the following change on Sunday, August 14th. At midday the larva was found in a rigid state on a piece of detritus, which it was grasping by the anal proleg. The anterior two-thirds of the body was projected into the air, forming with the posterior third an S-shape. It was motionless, and appeared entangled in threads of mycelium. In moving the larva, it showed signs of life, and it was then placed on a piece of detritus, where it still retained the same peculiar shape. Presently it gave a few pecks, not more than a dozen, when the black chitinous covering of the head came off and rolled to one side, disclosing an absolutely colourless head; it then proceeded to wriggle out of its old skin, to do which it rose into the air, and freed itself by working its prolegs. Examination of it at this stage showed the larva to be colourless, except for the third segment on the dorsum, which was a yellow brown, and for the terminal segment, at the very extremity of which four black dots were placed dorsally so close together that they were hard to count. The whole process took from fifteen to twenty minutes, and the larva after a few pecks crawled under some debris from which it occasionally protruded its head.

When examined at 5 p.m. the same evening the head was once more a jet black, and the tail hairs which had been represented by the black dots were fully grown, and jet black also.

Measurements of Larvæ at Different Ages.—These are shown in the table below. The figures were obtained by measuring larvæ of different ages with a view of establishing the number of instars in the life of the larva. As already mentioned, the chief change occurs at about the fifteenth day, when the two caudal hairs are replaced by four.

In these experiments the larvæ were reared up to the fifty-third day without turning into the pupæ. They, however, at this stage very closely resemble larvæ found in Nature, which pupated in similar surroundings. The chief changes noted were in the difference in size of the head and caudal hairs compared with the body. Just after a change the head and hairs were large in proportion to the body. With growth this changed till the body appeared too large for the head.

Age of larva Days	Length of body mm.	Length of tail hairs mm.	Total length mm.	Breadth of head mm.	Breadth of body mm.
2	0·4125	0·5	0·9125	0·11	0·1
7	0·5	0·48	0·98	0·125	0·1
12	1·05	0 525	1·575	0·112	0·16
14	1·0	0·525	1·525	0·125	0·175
24	1·562	0·65	2·212	0·15	0·25
35	1·75	0·9	2·65	0·175	0·25
47	2·328	1·0	3·328	0·2	0·13

When about to pupate the larva ceases to eat and to move. Pupation has invariably occurred at night. Before a moult the skin appears moist and broken down.

Pupa.—The pupa much resembles the ordinary obtectate pupa, the various parts being separately encased. Its length varies from 3 to 5 mm. It consists of head, thorax, and abdomen.

The changes which occur during pupal life consist in the gradual growth of the imago. In the body of the young pupa can be seen various tubules, which become masked with growth, owing to the deposition of pigment.

The longest term of pupal life has been sixteen days, the shortest eleven. Two days previous to hatching pigmentation becomes very marked. Pupæ hatch out most readily when the atmosphere is heavily laden with moisture. Pupæ on stones which have been damped hatch out in twenty-four hours.

The eyes, which are black and very conspicuous, are separately encased. The mouth-parts are enclosed in a common structure, derived from the eye cases, which descends in front like a mask. On the lateral and ventral surfaces appear the six legs, each separately encased and directed under the body towards the tail extremity. Coming from above the eyes and directed backwards and downwards, overlying the middle legs, are the antennæ, each separately encased. A somewhat flat and triangular case enclosing the rudimentary wings arises above and behind the leg cases, which are covered over by them.

The thorax on its dorsal aspect shows three segments, the prothorax being markedly smaller than the meso- and meta-thorax, which are similar in size.

The abdomen on its dorsal aspect consists of ten segments, the first eight being differentiated by a small but conspicuous spine on the dorsum at the posterior border. These are absent in the last two segments. On the ventral surface only seven segments are to be seen, the anterior ones being covered by the limbs and wing cases. Covering over the last two segments are the remains of the last larval skin, all crumpled up, but still retaining the body spines and caudal hairs.

The pupa attaches itself to a stone by the dried secretion which is formed at its last larval moult, thus having its movements restricted. This attachment is so firm that it is usual when removing a pupa to remove the underlying surface from the stone, as is seen in fig. 5.

When stimulated by touch, light, or chemicals, it carries out rapid antero-posterior movements. A short exposure to direct sun does not kill; after fifteen minutes' exposure a pupa was treated with 10 per cent solution of formalin with glycerine, and only gave signs of irritation. On placing it in alcohol 25 per cent for dehydrating purposes it gradually died. When put up in oil of cloves a pupa will show signs of life for a short time after being mounted.

Desiccation will kill the pupa, but so long as a pupa is not absolutely dry it will live until moisture is supplied, when, as already stated, it will hatch out in a short time.

The Phlebotomus Fly.—No attempt at classification has been made, as Professor Newstead is working out this subject. Two points, however, will be here referred to :—

(1) There are some flies which are jet black in colour, and these, although rare, are probably in sufficient numbers to exclude their being examples of melanism.

(2) The relative proportion of the various parts, such as the eyes, legs, body, and claspers, to the wings and to each other, gives rise to appreciable differences, but whether these are of sufficient importance for the creation of new species remains to be seen.

Closely allied to the Phlebotomus are several flies which are often confounded with it; the *Psychoda phalænoides* is an example. These flies have been bred out in pond water, in cesspits, in catch-pits, in sewer-shafts, and in damp earth from water channels, from flowerpots, &c.

Another fly which is to all appearances a Phlebotomus has been bred from the rotting fruit of the prickly pear, the difference being in the larvæ, which have no caudal hairs. These flies breed out earlier in the season and are not troublesome bloodsuckers.

Professor Grassi, in his monograph, mentions the three following species, but states that he has only met with the *P. papatasii*, Scop.

(1) *P. papatasii*, Scop.

(2) *P. minutus*, Rond.

(3) *P. molestus*, J. Costa.

The following characteristics, he states, are based on differences in the copulatory feelers and appendages.

The palpi in *P. minutus* have the last segment the longest. "The wing nervures are trifid."

In *P. molestus* the segments of the palpi are all of the same length. The wings are more elongated and the nervures are bifid and forked.

Mr. Austen, of the British Museum, informs me that Professor Grassi has described a new Phlebotomus in the "Acti della Reale Acc. dei Lincei," Anno CCCV., vol. xvii., Fasc. 12, 2nd Sem., p. 681, which I have not yet seen.

Professor Newstead very kindly gave me a synopsis of the Maltese species the day he left Malta, with the reservation that it was subject to alteration. I am greatly indebted to him for it, and give it as it was given to me.

"*Synopsis of Genus Phlebotomus: Malta Species.*

"(*A*) Antennæ in both sexes with very long hairs extending to the last segment. The third segment is longer than the fourth. Hair on the abdomen recumbent in both sexes. *P. minutus.*

"(*B*) Antennæ in both sexes with very long hairs not extending to the last segment. Legs in both sexes relatively short. Genitalia of the male relatively small. Legs in both sexes relatively short. Abdominal hairs erect. (2) *P. molestus.*

" (*C*) Antennæ as in *B*. Legs in both cases relatively very long. Genitalia of male large. Abdominal hairs erect. (3) *P. papatasii*."

Palpi. The second and third segments approximately equal. *P. molestus*. The second segment about half the length of the third. *P. minutus*.

Antennæ.—The third segment more than twice the length of the fourth. *P. papatasii* and *P. molestus*. The third segment is a third longer than the fourth. *P. minutus*.

In all species both sexes have the antennal segments furnished with one pair of geniculated spines. In *P. papatasii* these occur on segments four to fifteen inclusive, and in both sexes.

The first pair of the above spines are present also on the third segment in *P. minutus*.

Flight.—The distance of flight is extremely hard to estimate, as the breeding grounds in most instances are only a few yards from the barrack rooms. In only one case was it possible that the majority of flies infesting a dwelling came from a distance of 80 to 100 yards. It may be that the range of flight approximates to that of the mosquito.

The flight is strong, forward, and undulating. The last characteristic enables one to follow the flight across a well-lit room.

The phlebotomus has a remarkable habit of hopping sideways, and is hard to catch on this account.

They are able to shoulder their way up between a cotton-wool plug and the sides of a test tube. In passing through mosquito curtains, the front pair of legs are first passed through, by which means the meshes are separated and a hole is made big enough to allow the fly to pull itself through.

Food.—The female alone is a blood-sucker. No male has ever been seen to bite, nor has one been observed to contain blood. Both sexes appear to drink water and to suck moisture, probably containing nourishment, from detritus. When kept in a cage free from detritus they die in from four to seven days, but when supplied with detritus both sexes will live from ten to fourteen days. The longest time has been twenty-eight days. In an experiment where about 150 flies were kept with detritus and given blood in a large cage which was kept moist by being covered with a damp towel, the last fly died on the twenty-eighth day. The majority, however, were dead at the end of ten days.

When females are kept in test tubes for breeding purposes, at first they may refuse to bite, but once they have fed, they will, if permitted, bite daily.

The following times were obtained in feeding experiments:—
Fed at 6 p.m. First feed, June 21. Time taken, 1¾ minutes.
Fed at 4 p.m. June 23. Time taken, 3½ minutes.
Fed at 7 p.m. June 24. Time taken, 5 minutes.

Many bites at the same time give rise to an intense "pins and needles" sensation. When the fly has finished feeding the bite is marked by a minute drop of blood. This within a minute or two is surrounded by a white weal. When there are several bites together they coalesce and the part has a boggy feeling. Fifty minutes after feeding the part (the arm) has a distinct erythematous rash, and is extremely itchy but is not scratched.

In the shade flies when disturbed will bite most warm-blooded animals at any time of the day. When about to feed, the female hops over the skin, inserting her proboscis from time to time, searching for a suitable place, which frequently is in proximity to a vein. Having made her selection, she proceeds to spread her legs wide apart, and grips the surrounding skin with her claws. She then inserts her proboscis to its full extent. In this position she has the appearance of standing on her head. Once the proboscis is inserted it is an easy matter to kill her, as to withdraw the mouthparts she has to raise herself on her legs.

The Phlebotomus does not leave its haunts in windy weather, but on still sirocco nights the flies begin to be felt shortly after sunset, and gradually increase in numbers as the darkness deepens. In the morning those which can escape from the dwellings retire to their haunts. The others retire to the dark corners of the ceilings.

It is a much debated subject whether the Phlebotomus is attracted by light. They are to be found in lighted rooms, but it is probable that they are attracted by the sense of smell, for when not biting they are to be found on the walls of a room, as are mosquitoes. To sit out of doors in the dark is to court being bitten.

The number found in rooms varies with physical conditions. They are always more numerous in buildings surrounded by walls and ramparts. Here the breeding grounds are close at hand and there is no air current.

SUGGESTED MEASURES FOR THE PREVENTION OF BREEDING.

These must be dealt with under the following various headings:—

(1) Walls.—The ideal arrangement would be to pull down all

superfluous walls; where boundaries are necessary they could be made with wire fences. At present all W.D. land has to be enclosed by walls which have to bear the recognized mark. The removal of useless walls would be beneficial in admitting more air to dwellings in the summer months. All walls should be properly faced with cement, to allow of no communication between the outside and the inside. Particular attention should be directed to the bases of wall, especially of those where the level of the earth differs on the two sides.

(2) Embankment Walls to Roads.—These should be faced with cement, or some substance that would not be washed away by the rains. The subsoil drainage shafts, where necessary, should be guarded by copper or aluminium wire gauze coverings of very fine mesh.

(3) Embankments such as the Cottonera Lines should have all stones well rammed home and the surface covered with a sufficient layer of soil. To keep this earth from being washed away it would be well to plant thyme and pennyroyal, two aromatic weeds which flourish in the hot weather. The following experiment was carried out, and although extremely artificial it points to the fact that these weeds are injurious to the Phlebotomus. Test tubes were put up containing various aromatic weeds. Into each a fly was introduced, and the mouth of the tube closed with a layer of chiffon. Within an hour the flies in the tubes containing the thyme and the pennyroyal were dead, whilst those in the other tubes were still alive twenty-four hours later. The physical conditions were identical for all the tubes.

The ramparts of old defences would require facing, and clearing of the caper plant which grows abundantly in all crevices. If it were possible to pull down these old ramparts and to fill in the surrounding moats it would give more space round barracks, and would allow of waste areas being put to use. If this were impossible wide cuttings might be made to allow of a freer circulation of air. Caves and disused mines should have all entrances and communications closed. Old storm water channels should have modern pipes laid in them and their galleries filled in.

That these measures mean an expenditure of money is self-evident, but in all probability they would lessen the numbers of the Phlebotomus immensely, even if only carried out within a small radius. The works, however, are of a permanent nature, and therefore after the initial expense their upkeep would not be great.

SUGGESTED MEASURES FOR LOWERING THE INCIDENCE OF THE "SANDFLY" FEVER.

(A) The trapping of flies.

(1) Flies have been found to enter pickle jars containing moist detritus placed in dark corners of a barrack-room, as near the ceiling as possible. This method would require a lot of supervision, and on that account is hardly feasible.

(2) In the event of the fly which is bred from the rotting prickly pear fruit proving to be a blood-sucking Phlebotomus, it would be essential to have all prickly pear fields cleared of rotting fruit, which should be burnt.

(B) The spraying of barrack rooms with formalin solution is attended with satisfactory results. This was carried out in June, 1907, in C block, Floriana. No. 1 room in this block had cases sent to hospital on the 18th, 19th, and 21st of that month. The room was then disinfected with the spray, which resulted in the death of numerous "mosquitoes and sandflies." A further case occurred on June 24, and after this three cases only occurred, on July 13, 14, and 25 respectively. By disinfection the infected flies are killed off, and the probability is that with the removal of infected men the flies will not become infected.

(C) Early removal of patients to hospital and their protection with fine meshed nets. This is very hard to achieve, as men will not report sick early, and it has been found by Doerr and by Lieutenant-Colonel C. Birt, R.A.M.C., that the blood is infectious only during the first twenty-four hours of the disease.

(D) Protection from bites by the use of ointments. Ointments are of use in lessening the biting of the fly, but it is only when a man is covered with bites and has passed sleepless nights that he will apply for relief. Men who have been long resident in Malta, of their own accord smear themselves over with paraffin oil.

I have been in the habit since 1907 of giving the following ointment to men, women, and children, the latter, as a rule, being great sufferers :—

Ung. ac. boric.
Ung. zinc ox.
Ung. eucalypt. .. .. āā part. æq.
Calomel .. .. .. gr.v. to x. ad. ℥i.

The ointment to be rubbed over exposed parts.

Another ointment which I am told is of use has verbena in it :—

Adipis lan. hyd.	
Ol. olivæ	āa ʒss.
Ol. verbenæ	♏x.
Aq. calcis	℥i.

Make a cream.

(E) Acclimatization. It might be advisable to put new regiments arriving in the Island in the Imtarfa and St. Andrew's Barracks, instead of their occupying the Floriana and Verdala Barracks, which are noted for the prevalence of Phlebotomus.

I would again like to thank Serjeant T. Kerr, R.A.M.C., my assistant throughout these investigations, for the willing and capable way in which he has helped me. To Lieutenant Drake-Brockman, R.G.A., my thanks are due for the translation of the chapter "Practical Conclusions" in Professor Grassi's Monograph, and to Staff-Nurse Miss Rogers, Q.A.I.M.N.S., for all the drawings, except No. 2, which was drawn by the aid of a camera lucida; also to the officers of the Royal Engineers in the Eastern District, who gave me all the assistance asked for.

THE PHYSIOLOGY OF THE MARCH.[1]

BY LIEUTENANT-COLONEL C. H. MELVILLE.
Royal Army Medical Corps.

I WILL take as the text of this paper a quotation from the Field Service Regulations of the German Army, which emphasizes somewhat more strongly than do our Regulations the paramount importance of this subject.

Paragraph 303 of the 1900 edition runs as follows: "By far the most important factor affecting the efficiency of troops for war is their power of marching. The march is the keystone of all operations, and the success of every undertaking depends very largely on the accuracy of the arrangements made for its performance. In many cases the arrival of a body of troops at the right place, at the right time, and in good fighting trim, may be the decisive factor in the situation."

I may be thought to be stepping somewhat out of my province in quoting the above regulations, which, of course, refer to marching from its purely military aspect; but I do so of set purpose, for important as marching is to the soldier as a soldier, it is just as important to the soldier as a doctor. Of all the causes which tend to lower the resisting power of the soldier, none is more important, none has greater effect, and none is more inevitable than marching. A commander may save his men from hunger, he may save them from thirst, and he may protect them from exposure, but march they must, and his aim must be to nurse their natural resisting powers to the utmost of his ability by sparing them as much as he can. To quote again from the German Regulations; para. 306 says: "However well trained troops may be in the art of marching, they cannot be expected to continue efficient in this respect unless they are spared every demand on their powers of endurance not absolutely necessitated by the object for which the march is made." To do this, to spare them these unnecessary demands on their powers of endurance, it is necessary to understand the physiology of the march, that is, the effect that the act of marching has on the bodily economy of the soldier.

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[1] A lecture delivered at the Staff College. Reprinted from the *Journal of the Royal United Service Institution.*

If these effects, and the mechanism by which they are produced, are thoroughly understood and constantly remembered, the march may be a cause, not of reduced but of increased powers of resistance.

I propose to consider the question of marching under two aspects: First, the effects of marching pure and simple, under ordinary service conditions; and, secondly, the effect of prolonged and continuous forced marching.

First, then, I will begin with marching pure and simple, and will, to clear the ground, give a definition of what I intend by the word marching. Marching, then, means walking; wearing certain clothes; carrying a certain load, disposed on the body in a certain manner; at a fixed pace, regulated, not by the physical necessities of the individual, but by the average physical character of the body of troops of which he forms a part. That seems rather a complicated way of stating a very simple fact, but I think it will be admitted that all the above particulars are essential to the idea of the marching soldier as distinguished from that of the walking civilian, and it is these particulars which so differentiate the two that constitute the problem of marching as apart from mere walking.

I propose to discuss the above definition step by step, and will, therefore, begin with the first word—walking. Walking is the result of muscular effort; that is, it is caused by the contraction of certain muscles. When a muscle contracts, that contraction is accompanied by two phenomena: visible movement and heat. Now I wish it to be understood that the contraction, the heat, and the visible movement are all absolutely interdependent, and essential to each other. You cannot have any one of the three without having the other two. You cannot have the heat without the contraction and the movement, nor can you have the movement without the contraction and the heat, and so on.[3] I will give you an exactly parallel instance. Those who have driven, or had any acquaintance with petrol motors, or other internal combustion engines, know that the visible motion of the piston is due to the combustion in the cylinder of a certain amount of petrol vapour, essentially carbon and hydrogen, and the consequent expansion of the gas, with the production of heat. Now I want you to understand that these two phenomena are absolutely and entirely similar. In the case of the muscle we have, as the result of a nervous impulse, which corresponds to the ignition spark of the petrol engine, the combustion of certain constituents of the muscle, consisting essentially of carbon and hydrogen, the consequent contraction of the muscle with the production of heat, and as a result the visible movement. The point to which I particularly want to direct your attention is the absolutely essential character of the heat produced. There can be no muscular action without the production of heat, any more than there can be an explosion of petrol vapour in the cylinder of a motor car without the production of heat. Now, if one group of muscles only contract, as when I bend my arm, the production of heat is so comparatively slight that it is absorbed by the blood stream, and distributed throughout my body without materially raising my temperature; but though the heat produced is insufficient to raise the temperature of my body perceptibly the heat is still there, and it can, with suitable instruments, be measured in the substance of the muscle that produces it. In addition it is proportional to the work done. The case becomes, however, very different if we consider the movement of a large number of muscles, and repeat this movement several times, as in the case of walking, rowing, or running. The heat produced in these processes is now so great that it raises the temperature of the body as a whole. To give you an actual instance. In a series of observations made in 1906 by Dr. Pembrey, of Guy's Hospital, and Captain Parker, Royal Army Medical Corps, at Aldershot, on soldiers marching under varying conditions of load carried, clothing, and so on, the temperature of the men was taken on 359 occasions before and after marching. The temperature of these men was found to have risen on an average to 2·3° F. above normal. This rise in temperature is purely physiological. It is the absolutely essential accompaniment of the exertion necessitated by the march. Now, it is obvious that if the muscles are continually producing heat, one of two things must result: either the temperature of the body must rise to such an extent that further exertion would be impossible, or the heat must be dissipated in some way or another. Ordinarily, the latter is the case.

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[3] There is, of course, the exceptional case where a muscle contracts against an insuperable resistance, and no movement results ; but the rule holds generally good.

The heat developed in the muscles is carried by the blood stream to the surface of the body, where it passes off in three ways: By the evaporation of the moisture of the breath; by direct radiation and convection from the skin; and by evaporation of the moisture of the perspiration. Of all these the last is by far the most important; that is to say, the heat produced by marching is got rid of, or dissipated, more by means of the evaporation of the perspiration caused by the exercise than in any other way. As I say, ordinarily this occurs, but if in any way the evaporation of the perspiration is interfered with, owing to the air being too damp to take up more moisture, or the body too thickly clad to allow of the moisture evaporating rapidly, the temperature of the body will rise to an injurious extent and a state of "fever," tending eventually to heat-stroke, will be produced. I will return to this later. What I want to emphasize at this point is, that the rise of temperature caused by marching is normal and inevitable, and, in addition, beneficial and necessary, and that the heat is, under ordinary conditions, passed off from the surface of the body by evaporation. I will return to my analogy of the motor car. As you all no doubt know, after a car has been running for a short time the cylinder becomes so hot that special arrangements have to be taken to cool it. These arrangements consist of a system of water circulation, which removes the heat from the cylinder, where it is produced, to the radiator at the front of the car, where the heat passes off from the water by convection. Now, all who have driven cars know that this heat is an absolute necessity, and that till a certain degree of heating is attained the car will not run its best; also that when everything is running smoothly the temperature once attained is kept constant. The two cases are absolutely parallel. In both man and the motor car you have a certain amount of energy produced, and as a necessary concomitant of that energy, heat. In both this heat is removed from the place of its production, in the one case the muscles, in the other the cylinders, by a circulating fluid; in both the heat is conveyed by this circulating fluid to the surface of the engine, and there dissipated to the surrounding air, by evaporation in the case of man, by convection in the case of the motor car. And in one case, as in the other, if you interfere with the dissipation of heat, by the skin or the radiator, as the case may be, you produce an over-heated condition of the engine, which in man we call "fever," or heat-stroke, and in both cases you lay the engine open to further serious injury as a direct consequence of this overheated condition.

The important point to keep in mind is this: When a man is at rest his body is at a certain temperature, say 98·6° F. As a result of disease or some other cause, his temperature may be raised to any degree above this, but it is recognized that until a certain limit is attained, say 103° F., this rise is only a danger signal, and not likely in itself to cause serious injury. At rest then this man has a margin of safety of, say, 4·5 degrees. The normal temperature of this same man at exercise is probably about 101·6° F., and this rise is as already stated physiological and beneficial. At the same time the danger point is not pushed further up the scale, and the margin of safety therefore is now reduced to 1·4 degrees. It is in this narrowing of the margin of safety that the danger lies, and from a physiological point of view the aim of march discipline, "under which is included everything that affects the efficiency of man and horse during the march" ("Field Service Regulations," Part 1, p. 40), should be to prevent any unnecessary encroachment on this margin.

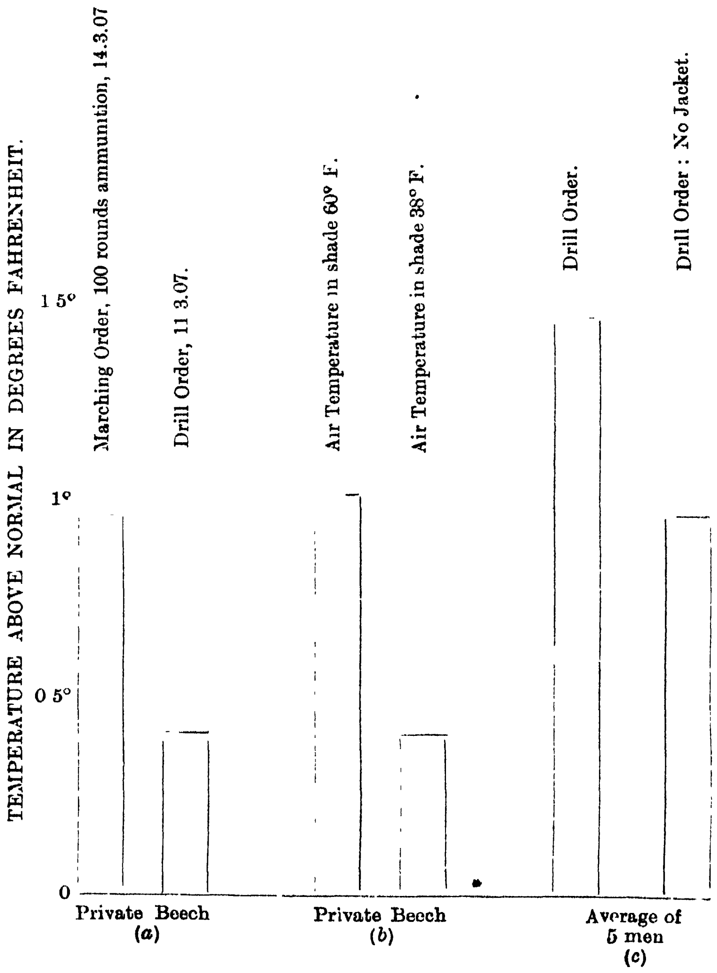
Now, the great difference between the civilian walking and the soldier marching is, that the former is at liberty by varying his clothing, his pace, and the load he carries, not only to minimize the production of heat, but to facilitate its dissipation, while in the case of the soldier such liberty is necessarily denied.

If you will turn to the definition of marching, which I gave at the commencement of this paper, you will find that everything that comes after the word "walking" refers to conditions which either add to the amount of heat produced in marching, or interfere with the proper dissipation of that heat. Thus, for instance, the load carried increases the amount of work done, and therefore, the amount of heat produced, the fact that certain clothes have to be worn interferes with the proper dissipation of that heat. Now, I wish to point out that the factors which interfere with the dissipation of heat are more important than those which increase its production, and at the same time are far more under control. As long as the heat produced by marching is allowed to escape freely from the surface of the body, no exertion, which the soldier is ordinarily called upon to undertake, will cause any material rise of temperature above what is normal and permissible.

The chief factor which increases the production of heat is the load carried and the way in which it is carried. I have drawn a diagram (*a*), Plate I, showing the effect of increasing the load on the production of heat. The observations were made on the same man, over the same ground, on two different days, of approximately the same temperature. On the first occasion the man was in drill order, and his temperature rose less than half a degree Fahrenheit; on the second he was in marching order, and his temperature rose

PLATE I.

EFFECTS ON BODY TEMPERATURE OF LOAD CARRIED.
TEMPERATURE OF AIR (WET BULB) AND CLOTHING.



almost a degree. This experiment was carried out in the Long Valley at Aldershot over practically level ground, the load therefore, had merely to be carried, not lifted. Of course, on a hillside this would be very different, as the work done would be increased by the number of pounds the man had to lift through each foot of the ascent. Every superfluous ounce of weight that a man carries has a definite effect in increasing that man's temperature, and though the increase may not, as long as the load is fairly light, or the march fairly easy, be of any great importance, it must be kept in mind that beyond a certain limit every successive ounce has a greater effect in raising the temperature than the ounce that went before it, and that this progressive increase gets relatively greater as the weight mounts up.

To show the influence of the weight carried, and the manner in which it is carried, on the energy output of the soldier, it has been calculated that the work done in carrying 20 lb. in the hand is three times as great as if the weight were carried symmetrically on the shoulders. The accuracy of this calculation has been confirmed by several observers.

If the load be materially increased to say 60 lb., and the march increased in length, and especially if the other conditions of weather, &c., be unfavourable, the temperature may rise very considerably. Thus the German physiologist Zuntz records that a load of 68 lb. on a march of 15 miles sent the temperature of the men under observation up to 102·5, and in one case as high as 104. He states that the men whose temperatures were 103 and over, had flushed, purple faces, a vacant, unseeing stare, and were obviously on the verge of breaking down. He also adds the interesting note that a load of 48 lb. on a very hot day has the same effect in raising the temperature as a load of 68 lb. on a cool day. The way in which the load is carried is, of course, of enormous importance. A badly balanced load means constant muscular effort to maintain the equilibrium of the body; constant muscular effort means constant production of heat, in this case unnecessary heat. For this reason the weights should be as close to the centre of gravity of the body as possible. The centre of gravity of an unloaded man is a little below the navel, and vertically below the point of the shoulder. Any weight placed on a man's back at once displaces his centre of gravity to a greater or less extent, and the greater the distance to which his centre of gravity is displaced, horizontally or vertically, the greater the effort he has to make at every step to accommodate his muscles to the new conditions; the greater the effort the greater the muscular strain, and the greater the muscular strain the greater the unnecessary evolution of heat. The total weight carried by a man, and more especially any additions to that weight, must always be considered in relation to the actual body weight of the man himself.

Take the average man as being 10 stone or 140 lbs. when unloaded; it is obvious that the whole internal economy of that man is regulated by the fact that his muscles have, as a rule, that weight of flesh to move along the level or uphill. If to this live weight, to which his muscles are accustomed, you add dead weight, you are asking those muscles to do extra work, to which they are unaccustomed, and which at first they will do uneconomically. As long as the load is not too heavy, practice will train the muscles to accommodate themselves to the new conditions; but there is a certain limit, different for each man, but regulated a great deal by his body weight, beyond which no amount of practice will enable him to carry the load, and still keep sufficient store of energy in hand for any other purpose. That is to say, the carrying of the load becomes his main function, and the power of fighting becomes subsidiary to it. What that limit is has not, so far as I know, ever been actually determined by experiment. It is probably, however, about one-third of the body weight, say 50 lb., which is roughly the weight carried by our infantry soldiers.

The temperature produced is affected not only by the load carried but also by the pace at which it is carried, and in two ways. In the first place it is obvious that if you carry a certain load a certain distance in ten minutes, and again do the same in five minutes, you produce an equal amount of heat on both occasions, since you do the same amount of work on both occasions. On the second occasion, however, you have only half the time to dissipate the heat produced, which naturally accumulates in the body to that extent. There is, however, actually a greater amount of heat produced for the following reason: The human engine, like all other engines, has a normal speed at which it does its work with the greatest economy. Any variation of that speed, either above or below the normal, is uneconomical, and more heat is produced relatively to useful work done in either case. As an illustration I would remind you of how much more tiring it is to walk at a pace accommodated to that of a child, than it is to walk at your normal pace.

The fact, therefore, that a man has to accommodate his pace to that of his comrades affects the amount of heat produced, in comparison with the amount of useful work actually done, because the work is done less economically. Every man has his own pace at which he can cover the ground with the least trouble to himself; any variation in this pace, whether in the direction of accelerating or retarding, increases the amount of heat produced for work actually done.

Other conditions also increase the amount of heat produced. Thus a tired man works less economically, burns more fuel that is, than a fresh one, and the heat produced in the body of a footsore man on the march may be as much as 10 per cent. higher than that produced in a sound man over the same distance.

We now come to the conditions which interfere with the proper dissipation of heat from the body, of which the principal are: first, the clothing; secondly, the fact that this clothing has to be of uniform character, and cannot be varied to suit personal idiosyncrasies, or, beyond certain rather narrow limits, to correspond to the variations of the weather; thirdly, the fact that the man has to march in a mass of other men; and lastly, the weather—that is the temperature and moisture of the air. All of these, with the exception of the weather, are of course more or less under control.

To begin with clothing. All clothing naturally interferes with the dissipation of heat from the body, which is the obvious reason why men strip to hard work. It interferes with the dissipation of heat because it interferes with the evaporation of the perspiration and with radiation. Even a very slight difference in the amount of clothing carried will make a very great difference in the rise of the temperature of the wearer. For instance, the same five men were marched from the Cambridge Hospital to Pondtail Bridge and back on two occasions, in drill order, the only difference being that in one case they wore their jackets, and in the other case they did not. In the latter case their temperatures rose one degree Fahrenheit, in the former one degree and a half. This was the same march as that referred to when I was speaking of the effect on the temperature of increasing the load carried, and it will be seen, diagram (*c*), Plate I, that the additional heat accumulated in the body, as the result of wearing a jacket on a warm day, was about equivalent to carrying a load of 30 lb. on a cold day. A rather important fact. I think the obvious corollary is, that since men wear their jackets they should not only be allowed to, but ordered to open them as much as possible. It is astonishing to me how often you see this not done on manœuvres. With our present infantry equipment this is easy, and one of the greatest advantages in that equipment is, to my mind, this ability to throw open the coat and expose the large evaporating surface furnished by the skin of the chest to the air. In any well-considered equipment there should be no band or strap crossing the body above the waist belt. All straps or bands should be vertical. The coat can then be thrown freely open, and I should, in addition, like to see it provided with buttons, so that the opened flaps could be buttoned back. For the same reason it would be an advantage if sleeves were capable of being rolled or buttoned up, so as to expose the skin of the forearm. It is all the more important to do this, that is to make all the use possible of what evaporating areas are accessible, because, by the nature of things, a great many which are open to the civilian are closed to the soldier. Even if the latter could take off his coat there is still the fact that he must carry at least a greatcoat, if not a pack, and where these touch the skin perspiration at once accumulates because evaporation is impeded.

There is on record a concrete historical instance of the effect of difference in clothing on the endurance of troops. It occurred at the attack on Chin-Kiang-Foo in the first Chinese War. The 9th Regiment, healthy and strong, having just newly landed, ascended the heights dressed according to regulation. The heat was intense, and numbers of men fell dead on the way from heatstroke. The 18th, 49th, and 55th Regiments, equally exposed to the sun, but with their jackets opened and their stocks removed, did not lose a single man from this cause. Of course, the removal of the stocks must have had some effect, but the main difference was undoubtedly that while the men of the 98th could not get rid of the heat produced by the march, since the perspiration could not evaporate sufficiently rapidly through their tunics, the men of the other regiments having their jackets open were able to take advantage of this method of reducing their temperature.

As to the effect of marching in a dense formation on the temperature of the men in the centre of the column, there are as far as I know no accurate observations. If you notice a flock of sheep being driven along the road, you will see at once the dense cloud of steam that arises from them, and, of course, one knows how a horse steams after a gallop on a cold day. This steam is merely the evaporating perspiration condensed and made visible by contact with the cold air. Now, it is easy to understand that towards the rear of a column the air must, especially if it is a still day, become so saturated with the moisture that has evaporated from the men in front that it will be unable to take up any more moisture from the men further back, who will therefore suffer from an accumulation of heat in their bodies. Obviously this is more likely to occur on a day when the air already contains a great deal of moisture, than on a day which, though hotter, is drier. Now, these factors which impede the dissipation of heat of which I have spoken, so far, are all, to a certain extent, controllable by the commanding officer. There is one factor which cannot be controlled, and that is the weather.

The effect produced by the weather conditions on the temperature of the soldier is due not so much to the heat of the air *per se* as to the amount of moisture it contains at that temperature. How marked the effect of the two combined can be, will be seen from the diagram (*b*), Plate I, showing the effect of weather conditions. The march is the same as that already mentioned, a distance of 7 miles across the Long Valley and back. This was performed by the same man in drill order on August 30, 1906, and on March 11, 1907. The temperature by the wet bulb thermometer was 22° F. higher on the first occasion than on the second, and the air much damper. The man's temperature rose barely half a degree on the second occasion, and over one degree on the first. That is to say, that the difference in the temperature and moisture above stated had an effect on the accumulation of heat in the body more than equivalent to that produced in the act of carrying 30 lb. the same distance.

There are other physical effects produced by the act of marching, but before I come to them I wish to emphasize the point, that what chiefly makes the difference between the soldier marching and the civilian walking is the fact that the latter can please himself in the measures he takes to dissipate the heat produced by walking, while the former cannot. What he cannot do for himself his officer must do for him in every possible way, and not merely for the man's comfort, but because every unnecessary decimal point of temperature that is allowed to accumulate in the man's body, not only throws an unnecessary strain on his heart and lungs, but brings him by so much the nearer to heat-stroke.

The other physical effects of marching are its effect on the heart, the lungs, and the weight of the body. But these effects are not primary effects, they are all secondary to the fact that marching is a muscular exercise, and as a consequence that it causes an increased production of heat in the body. To begin with the heart. The heart has to supply blood to the muscles in increased quantity, partly to supply increased fuel to the engine, but also, what is far more important at the moment, to supply increased oxygen to support the combustion that is the concomitant of the muscular action. This increased quantity of blood demands an increased activity of the heart, and, consequently, we find as one of the early results of marching a quickened heart beat. This increases in rapidity fairly regularly with the rise of temperature, and remains fairly constant once it has attained the rapidity demanded by the call of the muscles for oxygen. There are other factors probably that affect the rate of the heart, but for our present purpose we can consider the above as generally true.

The diagram (*b*), Plate II, shows the effect of change of air temperature. The heart beat was quickened from 70 beats to 120 on August 30, 1907, as compared with an acceleration of from 70 to 95 on March 14, 1907, though the man's temperature was practically the same in both cases. This is explained by the fact that he perspired exactly twice as much on the first occasion as he did on the second, his temperature being thus kept down. His temperature *production* in the two cases probably bore a very close relation to his heart beat. The chief point in which the marching soldier differs from the walking civilian in this connection is the presence of constricting bands in the former which the latter is free from. On service this is not so much the case, as dress then soon accommodates itself to the exigencies of the situation, but on manœuvres in peace time, unless the soldier is allowed to loosen his collar there may be some constriction on the big blood vessels of the neck. Otherwise there does not, with our present equipment, seem much danger of interfering with the action of the heart directly.

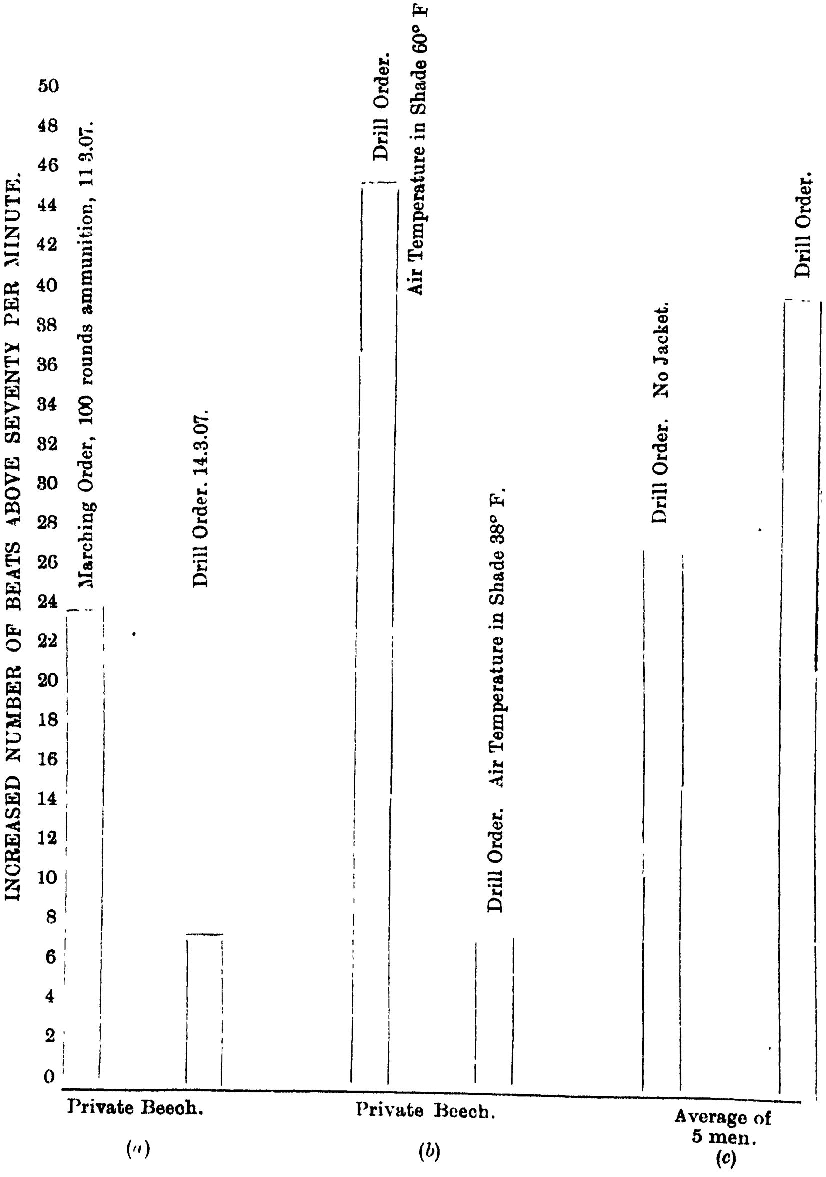
This has not always been the case. There is a record in the life of a rather well-known soldier of fortune, Donald Monro, of "a Danish captain who was accustomed to make the men of his company tie their cravattes very tightly, and use garters very tightly pulled below the knee, so that from the high colour of the face and the size of the calf they might appear more vigorous and better fed; but at the end of a certain time they almost all fell ill." In the case of the attack on Chin-Kiang-Foo, already alluded to, the pressure of the stocks on the blood-vessels of the neck, played some, though not the chief, part in the disastrous result.

We now come to the effect of marching on the respiration. The increased combustion in the muscles demands increased oxygen and, therefore, an increased supply of air to the lungs. The civilian walking can get this in two ways; either by increasing

PLATE II.

EFFECT ON PULSE RATE OF LOAD CARRIED.

TEMPERATURE OF AIR AND CLOTHING.



the number of his respirations or increasing the depth of each respiration. He probably makes use of both methods, but the latter more than the former. Here, of course, is where the soldier is handicapped. He has in breathing to move either the walls of his abdomen or those of his chest, or both. But a movement of either is affected by the weight he has to carry. He cannot, therefore, make free use of the method of deepening his inspirations, and must rely more than the civilian on increasing their number; but every inspiration he takes means a certain amount of work expended in lifting or moving certain weights which come into close relation to the walls of his chest or abdomen. This is inevitable, to a certain extent. What is not inevitable is that the weights should be so disposed on his trunk, and supported by straps so placed as to exercise the minimum of restriction to the movements of the chest and abdomen. In the old bandolier equipment every expansion of the chest had to work against three straps, viz.: the bandolier, containing fifty cartridges, and weighing 4 lb. 9 oz.; the haversack strap, supporting a weight of 2 lb. 14 oz.; and the water-bottle strap, supporting a weight of 3 lb. 12 oz. Now, that cannot be called giving the chest fair play. I have already told you that no strap should cross the body above the belt, so as to allow of the coat being thrown freely open to encourage evaporation. There is an equally strong argument in its favour on the score of facilitating respiration and the movements of the chest.

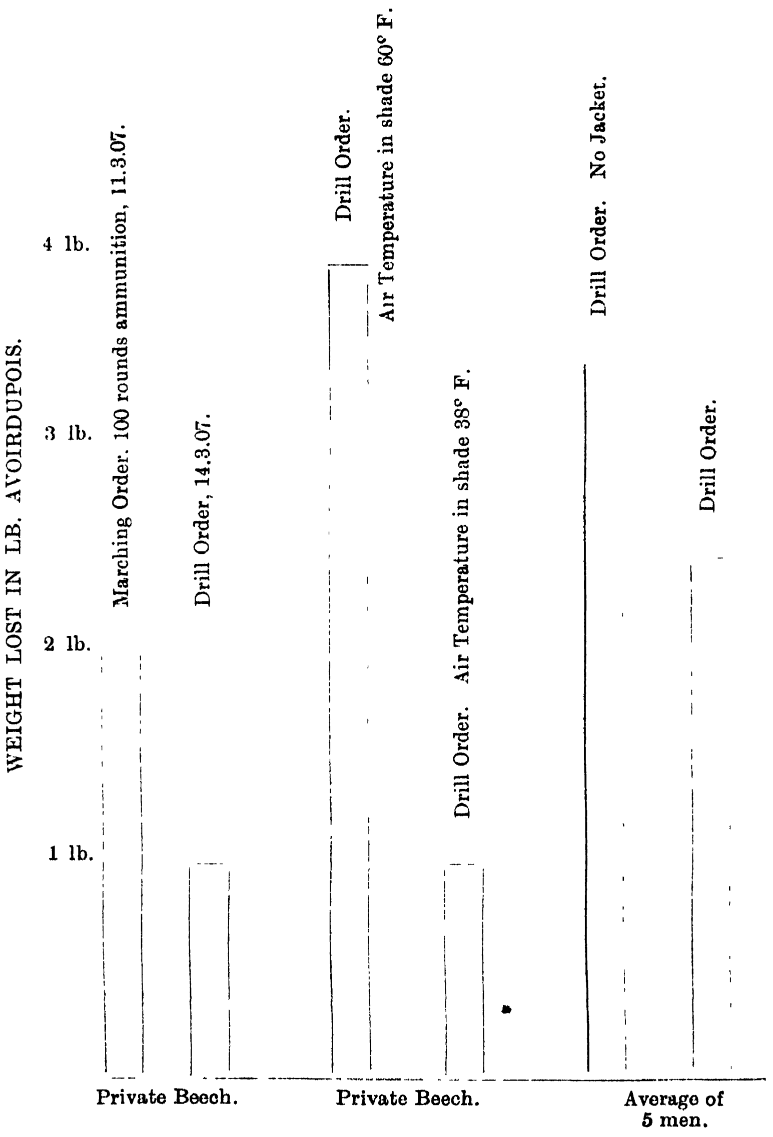
I am aware that the question of how to carry the load is extremely difficult, especially when so large a part of it must consist of ammunition which must be so placed as to be accessible. I said that there was not much danger of our present equipment interfering with the action of the heart directly, but indirectly there is a very considerable danger, and for this reason. Any impediment to the respiration means that the blood that is going to the lungs to get purified, on its way from one side of the heart to the other, becomes checked, and tends to head up towards the right side of the heart. At the same time the blood comes into that side, from the body generally, unchecked, and the right side of the heart and even the liver become overloaded and distended.

The third effect of marching is loss of the body weight. This is due to more than one cause, but, undoubtedly, the preponderating cause is loss of moisture by perspiration. This loss of moisture is, of course, directly proportional to the heat produced. In itself it is a healthy reaction. But it is considerably greater than one would at first suppose. Thus you will see from the diagrams

Plate III, that Private Beech, of the Yorkshire Regiment, lost on August 20, 1906, as much as 4 lb. of weight in a march of 7 miles across the Long Valley. The greatest weight lost by any one of the five men who made that march was higher than this, about 5¼ lb. This represents about half a gallon of water taken out of the system. The relationship of this loss to the efficiency of the soldier is of the very greatest importance. The body of a man who weighs 10 st. contains rather over 88 lb. of water. Of this he can afford to lose a certain amount only, and no very great amount. Any loss amounting to $\frac{1}{10}$ of the total, that is, less than 9 lb., unless replaced at once, means death, and long before that point is reached, naturally, exhaustion will have set in. Now, in the above case one of the men lost more than half the total permissible loss, and it is probable that a very little more would have resulted in his breaking down. The noticeable part of this is that these were not untrained men, but privates towards the end of the drill season. The importance of this loss of weight is that the great and debatable question of drinking on the march must be settled in definite relation to the amount of water lost, because this loss of water means a heightening of the specific gravity of the blood, a thickening of it, so to speak, and this thickening, if allowed to go too far, will eventually diminish the power of perspiration, and, therefore, the power of cooling the body, with results that can best be stated as heat-strokes. Now, of course, there are two kinds of thirst; the thirst of habit and the thirst of necessity. The former thirst is a habit that anyone can be trained out of, and one which every soldier should systematically be trained out of. It is very different with the thirst of necessity, which is the cry of the thickened blood for water. This is the thirst you cannot train men out of, or at least only to a small extent and with exceptional men. And besides, though you may train a man to disregard the sensation of thirst in his mouth, which is the outward expression of the actual deficiency of water in his blood, you cannot get round the fact that as long as he is working his muscles he is producing heat, and that if that heat cannot find its natural outlet, it will accumulate in his body, and the end of that is heat-stroke. If you want to press your men they must have water, or else they will not get through the march, or if they do will be fit for very little at the end of it. I am as great an advocate as anyone can be for water discipline, that is, for training men to abolish the thirst of habit. But there I stop. The great advantage of doing away with the thirst of habit is, that you can tell then when the real thirst

PLATE III.

EFFECT ON LOSS OF WEIGHT, OF LOAD CARRIED.
TEMPERATURE OF AIR AND CLOTHING.



begins, the physiological thirst that must be gratified if the human machine is to keep running. I will give an actual instance, illustrating the necessity of attending to this point. If you will go to London Bridge on a hot day in the summer, you will find buckets of oatmeal water set there for the omnibus horses. These were placed there originally because the General Omnibus Company found that the death rate and sick rate of their horses from heat-stroke was so high, without this watering, that they had to make these special arrangements. Of course, their motives were purely commercial, and it has been found to pay. Therefore, in arranging for a forced march, it is wise to take particularly good care to see that there is as much water as can be got for the men.

The German Regulations are very clear on this point, and are worth quoting. "By far the greatest enemy of infantry on the march is heat, and special measures should be taken to protect men against this, which is one of the most important causes of depletion of the ranks. The best means at our disposal is careful regulation of drinking. Mounted officers or bicycle orderlies should be sent on ahead of a column to warn the inhabitants of villages to turn out and have water ready on both sides of the road for the troops. If possible a halt of short duration may be made for this purpose otherwise, if time presses, the men must snatch a drink as the pass, and if possible fill their water bottles."

There are two other points in connection with the subject the march, pure and simple, and those are the questions [illegible] halts and the effect of training. On neither of these is it necessary to say much. Halts have the effect of allowing the men's temperature to come back to normal, their pulse rate to lower, and the respirations to fall in number. The effect is fairly quickly felt. Thus, taking the pulse rate in an actual case. A man doing in fifteen minutes an amount of work equivalent to 32 foot-tons, that is equivalent to the work that a 12 st. man would do carrying 100 lb. 1 mile, raised his pulse to 132 beats per minute from 61; after two minutes' rest it fell to 100; after five to 82; after ten to 77; and after fifteen to 70. From what I have already said it follows that the frequency of halts should be regulated a great deal by the temperature, but even more by the moisture of the day. Marching small bodies of troops—a brigade, say—it seems to me to be a mistake to order a halt every hour, or at any stated period. The proper test for the time when to halt is the condition of the men at the rear of the column. One halt every hour for five minutes is a good general rule, but it is a mistake to be too rigid. The best criterion is the condition of the men at the rear of the column. A wise man takes his weight off his horse's back when he halts, and a wise man will take the loads off his men's backs, too, even at a short halt. With the present equipment this is easy, which is one of its greatest advantages. Field equipment should be so designed that it may be taken off and put on by the man himself in one motion. The great importance of getting the equipment off is that it not only takes the weight off the man, but that it also allows the moisture to evaporate from parts that have been covered by the greatcoat or sack. There is an old saying of General Stonewall Jackson's that a man rests all over when he lies down, and there is a great deal of truth in it.[3] As it is well known that the pulse and respiration are slower when lying than when sitting, there seems a sound physiological basis for doing so. As to training, the effect of this in reducing the rise of temperature, &c., is very striking. It is not merely a case of physical condition, since the four men of the Yorkshire Regiment, that were the subjects of the experiment, were in good enough physical condition at the start. These men marched the set march at the beginning of the series, carrying a load of 2 lb. only, and the same after three weeks' regular marching carrying 7 lb. The temperature of the air was practically the same on both days. On the first occasion the average increase in the pulse beat was 43 in the minute, in the temperature 2·1 degrees, and the loss of weight was 3¾ lb. On the second occasion the increase in pulse beat was 22 beats, in temperature 1·2 degrees, and the loss of weight only 2¾ lb. The difference when the man starts untrained is even more striking. Thus, in the case of Dr. Pembrey, the rise in pulse at the beginning was 72 to the minute, in temperature 2·2 degrees, and the loss of weight 2¾ lb. At the end of the period his pulse increased 28 beats only, his temperature 0·6 of a degree, and the loss of weight was under 2 lb. It is hardly necessary to tell you that training improves a man's capacity for marching, but one would hardly anticipate that taking men in good condition the mere practice of route marching repeated steadily several days a week for three weeks would have made so marked a difference.

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[3] The following quotation is of interest in this connection. It is extracted from "Twelve Years of Military Adventure," by Lieutenant Blakiston, who served in the later battles of the Peninsular War, in a Portuguese Battalion in the Light Division. "Our system of marching was calculated as much as possible to lessen the fatigue of the troops. During a march of about 12 miles or so we always made two halts, when the soldiers immediately took off their packs and lay down, each company resuming them only just in time to admit of its marching off in time." Vol. ii., pp. 176-7.

An ordinary march may be taken at 15 miles, requiring an expenditure of energy equivalent to 1,350 energy units; on the supposition that the man weighs 10 st., and carries the ordinary heavy marching order of the infantry private. This expenditure of energy is about three times as great as the actual effective work produced, since the human engine possesses a very high factor of efficiency, greater than that of any steam engine. This rule is true, however, only for comparatively moderate distances. As soon as fatigue begins to be felt the engine begins to work uneconomically, that is the amount of energy expended bears a higher ratio than before to the effective output of work. Already by the end of 15 miles some effect is felt in this direction, the expenditure of energy having in some cases been observed to rise by one-fifth. Each successive mile has a greater effect than the last. We see a closely analogous instance in the case of steam engines. Every horse-power over a certain amount demands an excessive expenditure of fuel, and the difference between 20 and 22 horse-power in this respect is enormously greater than that between 10 and 12. The human engine is similarly affected by pace, as already stated, but it is also affected by duration of activity, because, unlike all other engines, the body has to be self-stoking, self-repairing, and self-cleansing. These two last functions cannot be carried out satisfactorily while the engine is at work, and, therefore, the need for bodily rest. Now if you lengthen the march you shorten the period of rest, while at the same time you disproportionately increase the amount of unproductive expenditure of energy as I have already stated.

Repeat this day after day, and you can at once imagine the engine getting clogged by the waste products it cannot get rid of, and also weakened by the lack of repair of worn-out parts. You can, at the same time, understand how forced marching breaks up even the best disciplined force, not because the men will not march, but because, after a certain time, they cannot march. Of course, forced marches have to be made, and if they cause the breakdown of a third of the force that does not make them any the less necessary. But their effects can be minimized. In the first place the load can be decreased. It is, of course, the question of whether it is better to go light and want your comforts, or to have your comforts and be too tired to appreciate them. Much must depend on the climate, but a young healthy soldier ought to be able to stand a good deal of exposure, while flesh and blood, not being metal, his muscles cannot do more than a certain amount of work. The second resource is to feed the men. The energy necessary for every foot pound of work you do is supplied by a certain amount of food; or else by a certain amount of destruction of tissue. If the work is very severe, the latter always occurs, and it has been proved by direct experiment on athletes that the harder trained a man is, the better he can stand this waste. This waste can be checked by a liberal supply of food, which is unfortunately just the thing that is so hard to manage on a forced march of any duration even by the use of emergency rations.

Last, and to my mind the most important of all, is the question of water. As I told you before, if a man loses more than a certain amount of water from his blood in the way of perspiration, he will stop perspiring and his temperature will mount up. Not only this, but the thickened blood will be unable to remove the waste products of the process of combustion that has been going on in the muscles; this can only be carried on unsatisfactorily at the best while work is going on, and I am, therefore, not speaking so much now of the water supply on the road. It is the water supply on arrival at camp that counts in this case, and if you ask me, I should say the more the better. Of course, the question will always come in: Is it better to give the men their fill of doubtful water, or stint them to a limited supply of good? That depends entirely upon circumstances. If the march is the chief object, that is, if it is necessary to get to a certain point in a certain time, you must chance the purity of the water. Without water the men will not get there at all. Of course, the result may be an outbreak of enteric fever or dysentery at a later period, but if you have attained your objective in the meantime, that must be risked.

On the question of the pace of a forced march, it is, I think, of interest to note that in an order issued by General Stonewall Jackson in April, 1863, not long before his death, and, therefore, with all the experience of marching that he had had in the Shenandoah Valley behind him, he lays it down at 1 mile in twenty-five minutes, with a ten minutes' halt every hour. This we should count as slow, since it only means 2 miles an hour, and, of course, that entails the men being much longer on their feet than a quicker pace would.

The whole subject of marching, both ordinary and forced, is one which still demands careful experimental observation.

A SIMPLE METHOD OF PURIFYING ALMOST ANY INFECTED WATER FOR DRINKING PURPOSES.

By G. G. NASMITH, M.A., Ph.D.,
Chemist of the Board of Health of Ontario, Canada,[1]
and R. R. GRAHAM, M.B.,
Assistant Chemist.

Since 1897, when Dr. Woodhead sterilized the water supply system of Maidstone, England, by a solution of hypochlorite of calcium during a typhoid outbreak, this agent has been used more or less spasmodically for similar purposes. In 1898, Kanthack showed that 0·3 to 0·36 parts of free chlorine in one hundred thousand parts of sewage effluent reduced the number of bacteria from innumerable to fifty per cubic centimetre.

Two years ago the first system for continuously purifying a municipal water supply by means of chlorine in the form of calcium hypochlorite was installed in the United States, the amount of available chlorine being 0·3 parts per million parts of water. The success of this method for one year has established its efficacy, and similar plants are now being installed at various other places. The method is so cheap, so efficient, and the agent used so harmless, that there would seem to be a great field for its usefulness in this and other countries. We have shown that 0·3 parts of chlorine in a million parts of water, or roughly, one pound of chloride of lime to a million pounds of water (500 tons or 100,000 gallons) will not only destroy typhoid and colon bacilli, but practically all bacteria in water except a few spore formers.

It is a valuable means of sterilizing water because chloride of lime may be bought almost anywhere, is very cheap in the infinitesimal quantity used, is not only absolutely harmless, but leaves no taste in the water, and with a few directions may be used by anyone to render an infected water safe for drinking purposes.

The writers have worked out a simple method which can be used by miners, prospectors, or campers in Northern Ontario, or elsewhere, to purify immediately and on the spot any water which may be dangerous to drink. For armies in the fields such a method will prove invaluable, for every soldier could easily carry a couple of ounces of the chloride of lime and sterilize his own drinking water; hence the experience with enteric fever in South Africa need never be repeated.

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[1] Now Director of the Health Laboratories of the City of Toronto, Canada.

The method is as follows:—

(1) Take a teaspoonful of chloride of lime, containing about one-third available chlorine, and remove the excess of powder by rolling a pencil or other round object along the top of the spoon, or by flattening it with a penknife blade, so that the excess will be squeezed off.

(2) Dissolve the teaspoonful of chloride of lime in a cupful of water, making sure that all lumps are thoroughly broken up, and to it, in any convenient receptacle, add three more cupfuls of water.

(3) Stir up the mixture, allow to stand for a few seconds in order to let any particles settle (this stock solution if kept in a tightly-stoppered bottle may be used for four or five days), and add one teaspoonful of this milky stock solution to two gallons of the water to be purified in a pail or other receptacle. Stir thoroughly in order that the weak chlorine solution will come into contact with all of the bacteria, and allow to stand for ten minutes. This will give approximately one-half part of free chlorine to a million parts of water, and will effectually destroy all typhoid and colon bacilli, or other dysentery-producing bacilli in the water. The water will be without taste or odour, and the trace of free chlorine added rapidly disappears.

The writers have followed this procedure repeatedly, using only the simple apparatus mentioned, consisting of a teaspoon, a cup, and a 2-gallon pail. The water in the pail has been inoculated with typhoid and colon bacilli, and examined before and after chlorination. The result was invariably the same—namely, that all typhoid and colon bacilli were destroyed.

	Lake Ontario water	Lake Ontario water + typhoid bacilli	Lake Ontario water + typhoid + 1 part chlorine per million
No.	Bacteria per cc. at 20° C.	Bacteria per cc. at 37° C.	Bacteria per cc. at 37° C.
1	92	2,144	1
2	84	26,100	1
3	176	15,000	6
4	154	17,000*	2
		Substituting colon bacilli for typhoid—	
5	65	95	0
6	132	2,250	1

The method is also applicable to the sterilization of wells which have been infected, provided, of course, that the source of the infection has been removed. It would obviously be futile to sterilize a well situated in a farmyard from which organic matter and bacteria are constantly draining into the well.

If one knows the diameter and depth of the water in the well in feet, the amount of chloride of lime may be easily estimated. For instance, the writer wished to destroy the bacteria in the well at his summer cottage, the well being 6 feet wide by 4 feet deep. The formula would be radius squared $\times$ $22/7$ $\times$ depth of the water $= 3 \times 3 \times 22/7 \times 4 = 113$ cubic feet of water in the well. One cubic foot contains $6\frac{1}{4}$ gallons of water, so that there were $113 \times 6\frac{1}{4} =$ about 700 gallons of water in the well.

One and a half pounds of chloride of lime to 100,000 gallons will give roughly one-half part of available chlorine in a million parts of water, or 1 lb. to 66,000 gallons. Therefore, $700 \div 66{,}000 \times 16 = 1/6$ ounce chloride of lime was necessary to purify the well. The chloride of lime was mixed with water, diluted, and poured into the well, and then thoroughly mixed by plunging a long pole with a couple of strips of wood nailed across one end up and down in the water. The water before chlorination contained 950 bacteria per cubic centimetre with colon bacilli present; after chlorination there were only nine bacteria and no colon bacilli.

The water of Sturgeon Lake, which is a typical brown Northern Ontario water, was treated with one part of chlorine to a million parts of water according to the simple method outlined, with the result that the raw water count of 15,880 per cc. was reduced to 8 per cc.

Toronto Bay water taken from the slip at Aykroyd boat house was chlorinated on the spot in a pail found in the boat house, with the following results:

Raw bay water	Colon bacilli	Chlorinated with 1 part chlorine per million	Chlorinated with 0·5 part chlorine per million	Colon bacilli
16,000 bacteria	Present	18 bacteria	—	Absent
25,000 ,,	,,	9 ,,	—	,,
18,000 ,,	,,	—	13 bacteria	,,

Another series was made to determine what amount of chlorine could be added to a water infected with typhoid and colon bacilli, which would show a decided excess of chlorine by the potassium iodide starch reaction, and yet not be detected by the senses of taste or smell.

Chlorine in parts per million	Taste	Odour	Typhoid, colon, and other bacteria per cc. at 37° C.	Iodide test after half-an-hour
0·0	None	None	5,452	None
0·5	"	"	0	Strong
0·33	"	"	0	"
0·165	"	"	0	"
0·125	"	"	0	Slight

This showed conclusively that more than 0·125 parts per million of free chlorine will destroy typhoid bacilli in Lake Ontario water if properly mixed, and that though the iodide test shows an excess of free chlorine in half an hour, not the slightest taste or odour could be detected by four laboratory workers in strengths up to 0·5 parts of free chlorine per million, when the taste became evident.

Fifteen different waters obtained from various points in Ontario and covering all the types found in the Province, were tested by the method outlined, in order to determine whether the large amount of organic matter present in some of the swamp waters would use up the available chlorine more rapidly than Lake Ontario water for example, and thus destroy the germicidal effect of the chlorine.

In one of the fifteen samples, which was a shallow surface well water containing hydrogen sulphide, there was no trace of free chlorine in ten minutes by the potassium iodide starch method. In one sample of a brown swamp water the chlorine could be detected by the senses of taste and smell. In all of the others there was an excess of chlorine, as demonstrated by the blue starch reaction after ten minutes, and yet the chlorine could not be detected by the senses.

We feel confident, therefore, that if the directions outlined are closely followed, there will be a sufficient quantity of chlorine added to destroy practically all bacteria without adding any foreign flavour to the water. If the taste is present the amount of stock solution added may be reduced until the taste just disappears without destroying the germicidal action of the chlorine.

Precautions to be observed:—

Chloride of lime deteriorates rapidly when kept in cardboard packages or exposed to air. If fresh from the factory it should contain about one third available chlorine. Of six pound packages obtained at random from the shops, three were found of high strength, although the others would be suitable if more of the stock solution were used.

Manufacturer	Per cent. of available chlorine found	Nature of package
Mendlesohn Sons "Acme"	33·0	Zinc
T. Eaton Drug Co.	32·5	,,
Lyman's	29·1	Cardboard, resin lined
Chemical Laboratories, Ltd.	21·7	Cardboard
Moody's Royal	20·0	,,
National Drug Co.	19·5	,,

If the weak variety only is obtainable, then one and a half teaspoonfuls of the stock solution should be added to two gallons of water instead of one teaspoonful.

If the chloride of lime powder be kept in a tightly stoppered bottle it will retain its strength for a long period. The prospector would only need to carry two small bottles, one for the powder and one for the stock solution.

It is very important that the stock solution should be thoroughly mixed with the water to be purified, in order that no bacteria may escape the chlorine. The chlorine will not enter lumps or particles of organic matter, so that if such material, or salt or mud is present, it should be strained off or allowed to settle, and the clear water used for sterilizing.

Waters containing hydrogen sulphide must be given larger quantities of chlorine solution.

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United Services Medical Society.

A MEETING was held on May 10th, in the Royal Army Medical College. Fleet-Surgeon J. H. Whelan, R.N. (retired) read a paper on the "Action of Quinine on Malarial Fever," and maintained that quinine acted by destroying the malaria-affected red blood cells, caused them to break up, and so led to the death of the young parasites in the blood stream before they had time to sporulate—snapped the cycle of Golgi. He thought that the temperature charts, which he showed, bore out his contention that the action of quinine was due to free toxin and caused a rise of temperature shortly after its administration. Some experiments with malarial blood outside the body showed that quinine in the strength of 1 in 20,000 was able to liberate the parasites in fair numbers, and as the quinine content could be raised equally high in the body, he considered the same thing took place there.

Major W. S. Harrison, R.A.M.C., said that the action of quinine as a poison of the malarial parasite inside the red blood cell could be demonstrated easily, but one did not find extracorpuscular parasites in the blood of patients taking quinine, and he explained the temperature charts in another way.

Fleet-Surgeon W. A. Whitelegge, R.N., read a paper on "Eye-strain in the Royal Navy," and considered eye-strain (not due to errors of refraction) under the headings of ciliary strain, muscular strain, and retinal strain. In two years 4,819 cases were examined, and he had found eighteen instances of accommodative, and fifteen cases of muscle balance error, of a more or less degree, in which the symptoms had persisted, and which were caused by the strain of using high-power telescopes, binoculars, and range finders, but especially the latter, where the magnification was very great, and the lenses on the two sides were of different power. In these circumstances a very great strain was thrown on the eyes, and minor discomforts were extremely common. Many other causes of eye-strain were mentioned and the symptoms given.

In the discussion which followed, Fleet-Surgeon Gaskell expressed the opinion that a tendency to squint was a very fertile source of eye-strain, and that squints of a minor degree were commoner than most people supposed. People were too apt to try and cure this condition by means of glasses—in fact, he considered that many people wore glasses unnecessarily.

Clinical and other Notes.

A COMPARISON BETWEEN BLOODS OF SOME NON-MALARIAL AND MALARIAL EUROPEAN SOLDIERS IN SIERRA LEONE.

By Captain J. M. CUTHBERT.
Royal Army Medical Corps.

It is a matter of common observation among those sojourning in tropical countries with a humid climate, that the European, after a few months' residence there, becomes pale and anæmic-looking, although he may not have been actually ill at all. The paleness is very marked when one sees bodies of European troops, who have been in such a climate for some time, side by side with others who have newly arrived by steamer from Europe.

In Sierra Leone during 1909 and the first part of 1910 I was, on several occasions, able to note personally this contrast at times of arrival of drafts from home.

It is stated, and it seems to be a commonly accepted idea, that there is a general depreciation of the hæmoglobin percentage of the blood, or an actual deficiency in the number of erythrocytes due to climate alone, in the blood of Europeans after a few months residence in a humid tropical district.

To try to get some actual facts about the condition of the blood in such men I examined, in September and October, 1909, the blood of all the European soldiers in the Sierra Leone garrison who had not been ill during their year's residence on the West Coast, and who were due to go home in October, 1909. The total number was twenty-one only. The following table (A) gives the results.

It will be seen that the hæmoglobin percentage in all cases, as taken very carefully with Gower's Hæmoglobinometer, was never near 100 per cent. according to the scale of the instrument. However, I found new arrivals in perfect health only gave a reading of 80 per cent. on an average, and since I came home I have found that 80 per cent. of the scale is about normal for the instrument used. I have therefore worked out Column 2, calculating 80 per cent. as 100 per cent., and Column 4 is calculated from the corrected figures. Column 4 then shows the hæmoglobin per corpuscle, taking 1 as the normal index and reckoning 5,000,000 as the normal count of the erythrocytes. Thus a normal blood would show 100 per cent. hæmoglobin, 5,000,000 red cells, and 1 would be the term of the hæmoglobin per cell, or the hæmoglobin index.

The figures in table A show that there is on an average no anæmia as far as the number of the red cells go (only three men were anæmic in this respect), but there is a slight depreciation in the hæmoglobin index. This hæmoglobin depreciation is too small, it seems to me, to account for the pallid condition of the men. I take it, therefore, that the paleness may be vasomotor in origin, resulting probably in a chronic cutaneous capillary contraction, along with a hyper-activity of the sweat-glands, analogous to what is present temporarily in the cold sweating of the condition of shock.

TABLE A.

		1	2	3	4	5	6	7	8	9
No.		Hæmoglobin	Corrected percentage	Red corpuscles	Hæmoglobin index	White corpuscles	Polymorphonuclear leucocytes	Small mononuclear leucocytes	Large mononuclear leucocytes	Eosinophile leucocytes
		Per cent.								
1	Sjt. I. ..	92	115	7,136,000	0·81	10,880	66 1	23·3	10·5	—
2	Gr. H. ..	80	100	6,840,000	0·73	11.520	differential count not made.			
3	Sjt. B. ..	80	100	6,760,000	0·74	10,924	60·6	17·7	19·8	1·9
4	Gr. M. ..	82	102	6,500,000	0·78	6,680	differential count not made.			
5	Gr. H. ..	80	100	6,409,000	0·78	20,000	47·2	34·6	15·0	3·2
6	Cpl. C., R.E.	85	106	6,160,000	0·86	6,080	54·3	25·8	16·4	2·5
7	Sjt. G. ..	78	97·5	6,080,000	0 80	7,480	55·1	29·6	13·5	1·7
8	Gr. S. ..	88	110	5,840,000	0 94	8,720	59·05	12·0	27·0	3·9
9	Gr. B. ..	77	96·0	5,648,000	0 85	8,720	63·8	23·0	12·5	0·36
10	Gr. T. ..	80	100	5,544,000	0·90	9,200	74·1	19·1	5·6	0·9
11	Gr. P. ..	80	100	5,520,000	0·91	9,520	52·02	28·4	16·1	3·4
12	Gr. K. ..	78	97·5	5,520,000	0·88	11,240	67·6	13·9	13·0	5·6
13	Spr. C. ..	72	90·0	5,464,000	0·82	8,560	77·1	15·1	5·1	0·5
14	Gr. M. ..	71	88·7	5,360,000	0·82	12,800	58·6	18 6	18·0	4·6
15	Bdr. P. ..	75	93·7	5,048,000	0·92	12,320	61·4	21·3	14·7	2·5
16	Spr. C. ..	78	97·5	4,896,000	0·99	5,760	61·03	20·0	16·0	2·6
17	Pte. F. ..	92	115	4,866,000	1·18	7,120	differential count not made.			
18	Gr. T. ..	75	93·7	4,800,000	0·98	8,400	73·6	13·7	8·7	3·8
19	Gr. S. ..	80	100	4,280,000	1·16	10,000	64·3	15·5	15·8	4·6
20	Qms.-Sjt. S.	79	99·0	4,200,000	1·17	11,520	60·2	26·4	9·1	3·0
21	Cl.-Sjt. T.	70	87·5	3,680,000	1·19	5,600	50·4	23·0	23·8	2·8
	Total ..	1,672	2,089 1	116,551,000	19·21	203,044	1,106·5	381·0	260·6	47·86
	Average..	79·5	99·5	5,550,190	0·91	9,668	52·7	18·15	12·4	2·28

Probably some of the men in table A, judging from their differential leucocyte count, were infected with malaria, although no parasites were found in any of their bloods, nor had any of them been ill. It is of interest to note that of the three decidedly anæmic men (Nos. 19, 20, 21), two (Nos. 19 and 21) have such a high percentage of large mononuclear leucocytes as to indicate a probable malarial infection. It is worth noting the compensatory increase in the hæmoglobin index in those with a somewhat low number of red cells.

It may be interesting to compare the above figures with the differential leucocyte count (table B) of twenty white soldiers who were completing their year's tour on the West Coast, and all of whom had been ill, some several times, with malarial fever (confirmed by the microscope) during their tour.

It is unfortunate that, owing to shortage of medical officers, due to sickness, &c., at the time I was examining this second batch of men, I had to go out to camp and hill manœuvres with the West India Regiment, and could not, on that account, complete the hæmoglobin estimation, nor the red and white cell count of these malarial subjects. When I came back from camp, the men had left for home. Thus table B is not so complete as regards the general blood count as table A.

TABLE B.

No.		Polymorphonuclear leucocytes	Small mononuclear leucocytes	Large mononuclear leucocytes	Eosinophile leucocytes	Mast cells
1	Gr. W.	50·5	26·0	20·8	2·6	..
2	,, G.	39·7	29·5	24·7	6·0	..
3	,, W.	37·1	26·0	30·8	6·0	..
4	Br. B.	69·1	12·5	14·2	3·0	..
5	Gr. S.	55·0	25·8	17·8	0·8	..
6	,, S.	57·5	21·5	12·0	9·0	..
7	,, D.	63·2	13·0	14·7	7·0	0·3
8	Gr. B. (parasites present)	48·5	18·0	30·0	3·4	..
9	Gr. I.	50·8	25·4	18·4	5·4	.
10	,, W.	63·5	14·5	20·0	2·0	..
11	,, C.	58·7	15·5	23·3	2·3	..
12	,, W.	55·0	19·5	22·0	2·6	0·9
13	,, C.	57·5	17·9	20·6	2·6	1·2
14	,, H.	44·2	19·6	19·3	16·7	..
15	,, S.	48·3	20·5	29·0	2·2	..
16	,, G.	66·8	12·0	20·4	0·8	..
17	,, A.	52·0	22·0	20·8	4·6	.
18	,, M.	47·6	34·0	16·2	1·1	..
19	,, P.	59·8	15·5	20·0	3·8	0·7
20	,, G.	72·0	11·6	10·4	5·5	..
	Total	1096·8	400·3	405·4	87·4	3·1
	Average	54·84	20·01	20·2	4·3	0·15

It will be noted that there is a striking difference in the average percentage of the large mononuclear leucocytes in tables A and B, viz :—14 compared with 20·3 ; also that in only 2 of the malarial cases in table B was the percentage of the large mononuclears below 14, the average percentage of the apparently non-infected cases. (These two may have become completely free from malarial infection.)

Although in only one of the above cases with a malarial history were malarial parasites found at the time of the blood count, I would consider all the cases showing a large mononuclear percentage of over 14 or 16 as probably still infected and liable to recurrences. It would be interesting to know how many got recurrences after arrival home. (It should be pointed out that all these men, in both tables A and B, were getting prophylactic quinine twice weekly, and would not readily show parasites in their peripheral blood.) It will be seen that the one No. 8, table B, showing parasites also had the second highest large mononuclear percentage.

I consider, both from the above cases and from many others that I examined, that the differential leucocyte count is a very valuable method in helping towards the diagnosis of malaria.

There is one point that should be remembered, namely, that in a malarial district the presence of malarial parasites or a high large mononuclear percentage in the blood of a sick man does not invariably mean that he is suffering solely from malaria; he may be suffering from some intercurrent illness. Another man may be infected with malaria and may appear to be in good health.

A SMALL, PORTABLE, LOW-PRESSURE CURRENT STEAM DISINFECTOR.

By Lieutenant-Colonel A. R. ALDRIDGE.
Royal Army Medical Corps.

The portable steam disinfectors on the market for the most part weigh from ¾ to 2½ tons, and cost £100 and upwards. For small hospitals and camps there seems to be a considerable opening for a small and inexpensive apparatus.

With a large disinfecting chamber the cooling from the surface is so rapid that it is necessary to heat the walls with a water, steam, or hot air jacket, and the large quantity of steam required necessitates some form of furnace. If, therefore, the weight and cost are to be kept low, the size must be strictly limited.

The machine described will take the complete clothes and bedding of one soldier, including the mattress in three pieces, or eight field service kits. If a mattress in one piece has to be dealt with it is necessary to remove the stuffing and to put this in the chamber separately from the case.

The disinfecting chamber consists of a rectangular deal box, tongued, dovetailed and strengthened with iron corner pieces. Its internal dimensions are 2 ft. 9 in. by 2 ft. 9 in. by 1 ft. 6 in. deep. The inside is lined with hair felt covered with zinc sheeting. It is provided with a lift-off lid similarly lined and fitting on an edging of felt, on to which it is clamped by eight brass, hinged, screw fasteners. Handles are provided on the outside of the box.

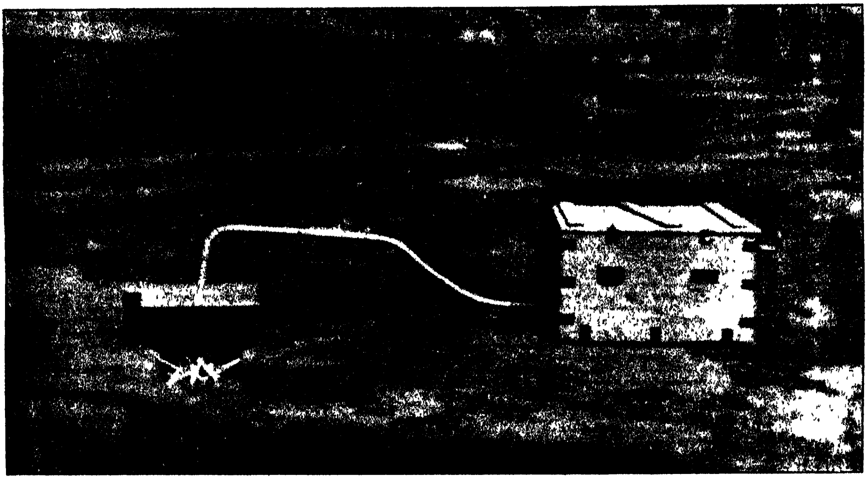
A wire cage with lid fits the inside of the box; the capacity of this is 10 cubic feet.

Steam is admitted through an inlet at the bottom of one side of the box, protected by a baffle plate on the inside. The outlet, provided with a sliding shutter, is on the opposite side, where also there is a thermometer.

Steam is generated in a wrought iron boiler holding 7 gallons of water, and provided with a feed box at one end, which serves not only for filling the boiler, but also as a gauge and safety valve.

A bent, wrought iron, 1 in. pipe conducts the steam from the boiler, and on to the farther end of this pipe a flexible metal tube is screwed, which carries the steam to the box.

In the field the boiler is placed across a 1 ft. trench splayed at each end, and a wood fire is lighted beneath it. For hospital use a simple grate can be made of bar iron.



Steam Disinfector.

The disinfecting chamber can be filled with steam—the thermometer registering 210° to 212° F., at ordinary altitudes—in from thirty to forty-five minutes. Half an hour is allowed for disinfection, and the clothes when removed dry very quickly if placed in dry warm air. About 60 lb. of wood are required for the first disinfection, and 20 lb. for each subsequent one if carried out continuously. After the first operation each disinfection, including emptying, recharging the chamber, and filling up the boiler, takes somewhat less than one hour.

The boiler, tubes, and thermometer pack inside the box, and arrangements are made for securing them for travelling. The apparatus complete weighs 2 cwt. 19 lb., and costs about £10.

For temporary use a disinfector can easily be extemporized on the same lines from a packing-case lined with felt or flannel, a 10-gallon oil drum, some metal tubing, and a thermometer. The early trials which led up to the machine now described were made with such an improvised arrangement and satisfactory results were obtained. The clothes, when removed, are somewhat wetter than with the complete machine.

The following experiments were carried out to test the efficiency of the apparatus :—

Experiment 1.—A soldier's mattress in three pieces, stuffed with coir, was put in the disinfector. An electrical contact thermometer set at 100° C. and a self-registering maximum thermometer were placed in the interior of the centre-piece of the mattress.

Fire lighted	10.45 a.m.
Temperature in box, 100° C.	11.30 ,,
,, in interior of mattress, 100° C.	12·0 noon.
Maximum thermometer registered 100° C.	

Experiment 2.—Contents arranged as in experiment 1.

Fire lighted	9·0 a.m.
Temperature in box, 99° C	9.35 ,,
,, in interior of mattress, 100° C.	9.42 ,,
Maximum thermometer registered 99° C.	

Experiment 3.—A soldier's mattress, two blankets, and a service kit were placed in the disinfector with a maximum thermometer in the interior of the centre-piece of the mattress. Cultures of *Bacillus anthracis*, *B. mesentericus* (both containing spores), and *B. typhosus* were mixed with sterile fæces, silk threads were soaked in the emulsion, dried for twenty-four hours in the incubator, enclosed in glass tubes, and these in envelopes, and placed in the interior of the centre-piece of a mattress.

Fire lighted	11.5 a.m.
Temperature in box, 100° C.	11.43 ,,
Disinfection stopped	12.13 ,,
Maximum thermometer registered 94° C.	

The cultures were planted in broth and plated on lactose-litmus-agar. No growths resulted. The controls of all three showed growths.

Experiment 4.—Contents as in experiment 3, but without cultures.

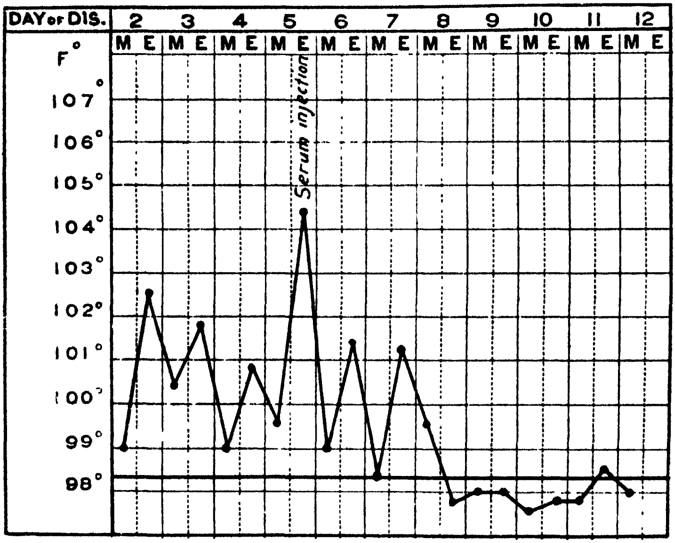
Fire lighted	9.55 a.m.
Temperature in box, 99·4° C.	10.35 ,,
Maximum thermometer in mattress, 98° C.	
Weight of a blanket when put into disinfector	4 lb. 4 oz.
,, ,, removed from ,,	4 ,, 6 ,,
,, ,, after half-hour's exposure to sun	4 ,, 1½ ,,

CASE OF STREPTOCOCCUS INVASION BEGINNING IN THE TONGUE. TREATMENT WITH ANTISTREPTOCOCCIC SERUM.

By Lieutenant-Colonel C. C. Reilly.
Royal Army Medical Corps.

G. C. T. reported sick about 11 a.m. on February 16th, complaining of a sore tongue. He said that he first noticed it the previous evening, and thought he must have bitten it. On inquiry no definite history of a bite could be elicited, and his statement only seems to have been put forward as a tentative solution and explanation of the condition.

His tongue was considerably swollen and tender on the left side. His throat, teeth, and gums appeared healthy. There was a small patch of abraded epithelium on the dorsum over the swelling, which was situated about midway between the tip and base of the tongue. There was no sign of anything that could be called a wound. Apart from the tongue, he complained of nothing. Temperature (oral) 99°. He was admitted to hospital and a mouth-wash of potass. chlorat., glycerine and hot water prescribed.



I was called to see the patient about 4 p.m; he was complaining of great headache. Pulse 120, full and bounding. Temperature 103·4° (oral). Tongue considerably more swollen but not so large as to protrude between the lips. Later in the evening the temperature (axilla) was 102·6°, the tongue was not more swollen and he seemed rather easier, deriving comfort from constantly sucking ice.

February 17th.—He passed an indifferent night. Tongue rather more swollen, not now permitting closure of the mouth. The swelling is now more on the right side than on the left. There is fullness and tenderness below the jaws on both sides, most marked on the right side. Temperature (axilla) 100·4°. Pulse 112. Respiration 24.

February 17th, Evening.—Tongue rather smaller. Swelling below jaws more marked. Temperature (axilla) 101·8°. Pulse 112.

February 18th.—Had an indifferent night, but slept at intervals. Temperature (axilla) 99°. Pulse 96. Tongue almost normal in size and speech almost unaffected. The swelling in the neck is lower in position, reaching down to the clavicles and less marked below the jaws. More marked on right side than on left. 6.30 p.m: Seems better. Temperature (axilla) 100·8°. Pulse 112. Tongue almost normal in size, but there is difficulty in separating jaws freely owing to stiffness of swelling below. Pulse is of better character. The swelling is lower in position, reaching to the level of the second costal cartilage in mid-line. Lower border convex extending up to inner thirds of clavicles and then up the neck, gradually lessening but more marked on the right side than on the left. The chin is now emerging from the swelling. The swelling as it extends on the chest lends itself more readily to exact appreciation. There is no œdema, a slight blush, doubtful tenderness, which seems rather a cutaneous hyperæsthesia.

February 19th.—Slept well last night. Tongue almost normal in size and quite easily protruded. Still unable to separate jaws to full extent but swelling has almost left the neck except for a little about the region of the right submaxillary gland. The swelling is changing in character, becoming redder and slightly œdematous and less diffused. It reaches now more than half way down the sternum, and is becoming more limited in its transverse diameter above as well as altogether more accentuated. The patient is able to masticate and swallow quite normally. An examination of the fæces, which was made to-day, revealed nothing abnormal. Urine normal in appearance and reaction slightly albuminous. He began to complain about 2 p.m. of considerable headache, and on taking his temperature it was found to be 104° (axilla) This continued till evening, when his temperature (axilla) was 104·4°. Pulse 108. The inflammatory area on the chest had extended somewhat, was more diffused at the margins, redder and considerably œdematous. It had a much more erysipelatous appearance than heretofore, but the edge was not distinct nor was it palpable. About 11 p.m. 20 cc. of Burroughs, Wellcome and Co.'s Polyvalent Antistreptococcic serum were injected into the flank and the skin beyond the margin of the inflammatory area was painted with a band of iodine liniment.

February 20th.—Better this morning. Neck clearer of swelling than yesterday. The inflammatory area on the chest has slightly increased downwards, passing beyond the iodine line in one or two places. There are doubtful lines of lymphangitis extending to both axillæ, but there are no enlarged or painful glands on either side or in the neck. Gape of jaws normal and tongue no longer swollen. Urine rather high-coloured, clear, normal in reaction. No albumin. From this date the inflammatory area, while extending slightly in a downward direction, gradually diminished in size until by the 24th it had entirely disappeared and was followed by a fine desquamation on the chest but not on the neck. By the 23rd the temperature had become normal.

ACUTE INFLAMMATION OF THE LIVER TREATED WITH IPECACUANHA.

By Major J. COWAN.
Royal Army Medical Corps.

Serjeant C., aged 31, service thirteen years, was admitted to the Royal Herbert Hospital on February 28th, 1911, complaining of vomiting and pain in epigastric and hepatic regions. He was under the impression that he was suffering from an attack of ague.

Previous History.—There is no entry of any importance in his M.H. sheet. He thinks he had dysentery in South Africa in 1900, but he enjoyed good health in India during his stay of nearly eleven years. He returned from India in February, 1910.

Personal History and History of Present Illness.—He is a small, wiry man of active habits, has played games—Association football and hockey—regularly throughout his service. He states that he drinks about 3 or 4 pints of beer daily.

On February 22nd he played in a football match, and received several knocks over the liver. Early on the morning of 24th he had a rigor with severe vomiting. Sickness and vomiting persisted until 27th, when he reported sick.

On admission to hospital he looked ill, face thin, and cheeks flushed, foul tongue, temperature 101° F., respirations shallow, pulse frequent, &c.; there had been no action of the bowels since 24th. Ordered enema, castor oil, sponging, &c. Blood examined for malarial parasites. Result negative, but the polymorphonuclears were noted to be increased. On the following day (March 1st, 1911) a leucocyte count showed high polynuclear leucocytosis (W.B.C. = 25,700 per cmm., polynuclears 91·5 per cent). The urine contained a trace of albumin, the sputum was "rusty" and contained pneumococci, but not in large numbers. There was profuse sweating.

The respiratory movements of right side of chest and abdomen were markedly diminished; the right rectus abdominis was very rigid. Liver dullness was increased upwards, and below the margin of the ribs in the nipple line; there was pain and tenderness in the liver area, also signs of consolidation of the base of the right lung.

On March 2nd, 1911, he was given ipecacuanha, gr. 30, preceded by tincture of opium, ♏ 10.

This dose was repeated on 3rd, 6th, 8th, 10th, and 12th. He vomited two hours after the first dose, and very slightly after the second; no vomiting after the later doses.

On March 6th, 1911, a leucocyte count showed: W.B.C. = 22,300, ratio nearly normal.

On March 7th, 1911, his temperature was normal, and it has remained so.

On 8th, a leucocyte count showed a remarkable fall in the number of white cells—W.B.C. – 13,700, polynuclears 70 per cent.

On 18th all pain and tenderness had disappeared, and liver dullness was normal. There was still slight cough, however, and the lower lobe of the right lung had not completely cleared up. Up all day and on generous diet.

On 24th a blood examination showed :—

R.B.C., 4,360,000 per cmm. Hæmoglobin, 80 per cent
W.B.C., 12,700 „ „

Lymphocytes and large mononuclears relatively increased. He is now convalescent, and gaining weight steadily.

The attack was of a very severe nature, and abscess formation appeared to be imminent for the first few days after admission.

There were no signs of dysentery, but on the advice of Lieutenant-Colonel Simpson, C.M.G., in charge of the Medical Division, the treatment with ipecacuanha—so strongly advocated by Leonard Rogers for amœbic hepatitis—was tried, and it appeared to have an excellent effect.

THE IPECACUANHA TREATMENT OF ACUTE HEPATITIS.

By Captain A. H. SAFFORD.
Royal Army Medical Corps.

The three following cases of acute hepatitis were admitted to the Station Hospital, Fyzabad, during September, 1910, and appear to be striking examples of the value of ipecacuanha in the treatment of this disease.

The powdered ipecacuanha was combined with tannic acid in the proportion of 3 to 1, and was given in the form of pills either at night or night and morning. The evening dose was given two hours after the last feed, and the morning dose immediately on waking. No opium or chloral was necessary, and no difficulty was experienced from nausea or vomiting.

Captain Nimmo, R.A.M.C., and Captain Kennedy, I.M.S., had charge of these cases during September, and handed them over to me on my return from leave early in October. I am indebted to these officers for their notes during this time, and to Lieutenant-Colonel Shine, R.A.M.C., for permission to publish the cases.

Case 1.—Private "B" was admitted on September 3rd, 1910, having been detained for two days, during which time he passed over a dozen stools a day containing blood and mucus. He stated that he had never suffered from dysentery or diarrhœa before. He usually drank beer to the extent of 4 to 6 pints daily. When he first came to India three years ago he drank 10 to 12 pints daily. He complained of pains in the epigastrium and diarrhœa. No liver symptoms.

The dysentery improved four days after admission and he was allowed light diet. About fourteen days after admission the patient complained of pain in the right side. A hard, localized swelling was felt about the size of a hen's egg just over the gall bladder, which was painful and very tender. No definite enlargement of liver. Temperature rose to 101·4° F. and patient perspired freely at night. Stools loose, watery, no blood. Ipecacuanha 25 gr. given at night, combined with tannic acid. This continued for a week, when the swelling became more diffused, and there was distinct enlargement of the liver downwards which rapidly increased to 2 in. below the costal margin, with pain and tenderness all over the hepatic region.

The ipecacuanha was increased to 45 gr. daily. Two days later he felt much better, and the ipecacuanha was gradually decreased. The patient made an uninterrupted recovery and is now in very good health.

On October 28th,1910, his weight was 9 st. 11 lb., and on January 31st, 1911, it had risen to 10 st. 8¼ lb.

Case 2.—Private " S," admitted on September 20th, 1910, complaining of pain in the right side and right shoulder. He had never suffered from dysentery, but had had diarrhœa for a week prior to admission. He stated that the pain came on suddenly in the right side, and was of a shooting character, which extended up to the right shoulder.

There was considerable enlargement of the liver downwards to 1 in. below the costal margin, and upwards for 1 in.; this was most marked in the mid-axillary line. There was also great tenderness over the gall bladder. Ipecacuanha, 25 gr., with tannic acid, 8 gr., was given at night.

September 28th, 1910.—His temperature has remained between 100° F. and 101° F. for eight days, and the pain is still severe, being most marked in the ninth intercostal space. There is distinct bulging on the right side. The ipecacuanha was increased to 55 gr.

October 1st, 1910.—The pain is now felt under the costal arch; it shoots up to the right shoulder. There is also severe perspiration at night, necessitating change of clothing. Examination of a blood-film showed a marked leucocytosis, but no numerical count made.

October 9th, 1910.—Pain and sweats continue. The prescription was to-day changed to ipecacuanha 30 gr., acid tannici 10 gr., night and morning.

The patient's condition gradually improved. Temperature normal on the 20th, and remained normal until the 27th. On October 21st, the ipecacuanha was reduced to 15 gr. night and morning; and on 25th it was further reduced to 10 gr. On October 27th the patient complained of a severe stabbing pain in the mid-axillary line, and noticed that the night sweats were worse; three days later he complained of an irritable cough; no expectoration.

A few coarse crepitations were found at the base of the right lung. The patient has become very thin and weak. Ipecacuanha again increased to 30 gr. night and morning.

November 3rd, 1910.—Considerable improvement, pain much less, He states the pain comes on at 3 p.m. and 9 p.m. daily.

November 5th, 1910.—Weight 7 st. 9¾ lb.; marked improvement.

At the extreme base of the lung there is a dull area 1½ in., with loss of breath sounds, resonance, and conduction, evidently some pleuritic effusion. No apparent leucocytosis.

November 10th, 1910.—Improvement continued. On further enquiry I find that he suffered from diarrhœa last year when in camp.

November 13th, 1910.—Very little pain and only slight sweats. The enlargement of the liver is rapidly decreasing and is now only slightly marked. Weight, 7 st. 12 lb.

From now onwards the patient made a slow but uninterrupted recovery. The ipecacuanha was gradually decreased, and he was finally discharged from hospital on December 16th, 1910.

His weight on November 5th, 1910, was 7 st. 9¾ lb.; this steadily increased, and on December 12th, 1910, it was 8 st. 10½ lb. in hospital clothing.

This case was particularly remarkable. On several occasions I decided to aspirate, but when it came to the point there appeared to be some slight improvement, so it was decided to wait, and aspiration was never performed, although it would seem that suppuration actually took place. It is unfortunate that no numerical blood-count could be made in this case.

Case 3.—Private " M " was admitted on September 27th, 1910, complaining of acute pain on the right side. He was detained for several days, during which time he suffered from acute pain over the hepatic area. He had just returned from Calcutta, where he had been for several weeks, and first felt the pain four days prior to his leaving for Fyzabad. He never suffered from dysentery or diarrhœa. He now drinks beer in moderation; he used to drink 6 to 8 pints a day, but states that during this year he has only taken an occasional pint, except during his stay in Calcutta, when he drank 8 to 10 pints a day.

On admission the patient looked ill and distressed. The tenderness was most marked in the mid axillary line between the sixth and tenth ribs. Liver was enlarged upwards to the upper border of fifth rib and 2 in. below costal margin.

On the sixth day after admission a hard swelling appeared over the region of the gall bladder, which was very tense and tender. He was ordered ipecacuanha 30 gr., acid tannici 10 gr., night and morning.

Examination of a blood-film showed a very marked leucocytosis. The patient's condition gradually improved, and he was discharged from hospital on November 5th, 1910. His weight then was 8 st. 7 lb., and on January 31st, 1911, it had increased to 10 st. 1 lb.

All three men are now in the best of health, and state they have had no recurrence of pain or dysenteric symptoms.

THE BRINE BATH TREATMENT AT DROITWICH.

By Major B. W. LONGHURST.
Royal Army Medical Corps.

The famous brine baths of Droitwich are, perhaps, not so well known as the baths of other celebrated Spas, but those who do know them, and have tried them, are convinced that they have no equal for sciatica and allied affections. Even that intractable disease, rheumatoid arthritis, is certainly improved, if not in some cases actually cured, by the celebrated brine treatment. I have visited these baths on many occasions both in winter and summer, and have conversed with a very large number of patients, many of whom have wasted large sums of money seeking health on the Continent and elsewhere in England before they were cured at Droitwich. I will therefore write a short description of the brine treatment, in the hope that it will be interesting to my brother officers who have not experienced the treatment as I have.

I will commence with a description of the brine, and then proceed to explain its uses.

The Brine.

Analysis of the brine has shown it to contain 20,000 grains per gallon of saline constituents in excess of that possessed by any other known water. The actual result of analysis is as follows: Chloride of sodium, 21761·8; chloride of magnesium, 2·5; sulphate of lime, 91·1; sulphate of alumina, 14·4; sulphate of soda, 342·7; iodide of sodium, 298; total salts to an imperial gallon, 22212·8.

Other analyses have been made varying slightly from the above, but they all prove that the Droitwich brine is the most potent in Europe, and from ten to twelve times stronger than the ocean. The brine is also radio-active, and its marvellous effect in cases of neurasthenia is attributed to this property.

The Uses of the Brine.—The British Medical Journal of June 15th, 1907, says: "As a place for bath treatment, Droitwich stands practically by itself in these islands. Hitherto, Droitwich has been modest both in its claims and aspirations, and has contented itself mainly with the treatment of chronic, especially muscular, rheumatism, and of sciatica. That the baths are extremely efficacious in a very large proportion of sufferers from these complaints is incontestable. Garrod, an impartial authority, in his article in the report of the Medico-Chirurgical Society on the watering places of Great Britain, speaks of the place with strong approval in connexion with complaints of a rheumatic nature, and Weber mentions its use as a tonic after acute illness."

The marvellous cures of chronic sciatica are, I think, the most striking to the medical profession. I have seen patients who have been crippled for months, and even years, able to run and jump and play tennis after a course of treatment at Droitwich. Sufferers who have given up all hope of cure, and have at last consented to have the sciatic nerve cut down upon and stretched, have recovered at Droitwich without any operation.

Many theories have been propounded to explain how the brine acts.

Absorption through the skin is suggested because the acidity of the urine is greatly diminished, the output of uric acid being eventually lessened. The patients themselves soon remark the change in colour of their urine, and the absence of pink deposit so well known in lithæmia. I have noticed that the urates are increased at first, and afterwards, as the urine becomes alkaline, they become diminished. There is no doubt that the brine acts in some way as a powerful uric-acid solvent, and that the radium emanation has something to do with this. I have seen wonderful results in neurasthenia, and I understand from the local physicians that these good results are due to radio-activity. This seems the most likely explanation, and is probably the reason why professional football players are sent to the brine baths to recuperate after a severe contest; the brine swimming bath is also frequently made use of by them when training. Professional athletes have told me that nothing sets them up more quickly than a few brine baths after a desperate struggle on the football field.

There is yet another advantage in balneo-therapeutics connected with the brine swimming baths which I believe is unique. Every deformity which can be cured by graduated exercise can be cured in the swimming bath. The density of the water is so great that exercises may be made very hard or very easy, according to the pressure exerted by the patient and the kind of exercise selected. The buoyancy of the water is so great that the bather can stand upright in the water, walk in the water, sit in the water, or even lie on the top of the water as if lying on an air bed; but there is one thing he cannot do, and that is to sink, and it would take enormous force to push him under. When lying upon the water, the limbs are equally supported in every direction by the saturated solution of brine; so that the patient can perform certain movements which he dare not attempt on land on account of the pain. These exercises have been successfully employed in the treatment of scoliosis, and to exercise painful joints; they are most useful during the convalescent stage of sciatica, also in the after-treatment of fractures and other surgical injuries.

There are two bathing establishments—The Royal Baths opened in 1836, and the St. Andrew's Baths, erected some forty years afterwards. There are three magnificent swimming baths with separate accommodation for ladies and gentlemen, the whole replete with every comfort, and supplied with a pure saturated solution of natural brine, pumped direct from the triassic formation some 200 feet below the surface of the ground. The establishments contain private hot reclining baths, douche, needle, and vapour baths; a handsome new block just completed, comprises special rooms for Aix douche baths, Nauheim baths and other modern forms of treatment, together with luxuriously-furnished cooling rooms. In the reclining baths, which are made of teak, wooden bars are placed across and over the patient to keep him immersed; the usual period of immersion is from fifteen to thirty minutes, according to the temperature of the brine, which varies according to the prescription of the local physician, but is generally somewhere between 98° F. and 101° F.

After the immersion the patient may rest in the dressing-room wrapped in hot sterilized towels, or be given a needle or douche bath, or gentle exercise in the swimming bath, which is always kept at a comfortable temperature. The charges for the baths are quite moderate, viz.: At the St. Andrew's baths the reclining bath, first class, 2s. 6d ; swimming bath, 1s. 6d. At the Royal bath, reclining bath, first class, 2s.; swimming bath, 1s. There are excellent hotels close to the baths, and the charges are not high. Before taking the baths, on account of any ailment, one of the local physicians should be consulted. I have known actual harm result from an attempt to treat oneself; indeed, those who have been to Droitwich, and have not benefited, have either tried to treat themselves or neglected to carry out the instructions of the local physicians. There are certain diseases which are aggravated and accelerated by the action of the brine, for instance, malignant disease, the growth of which is rapidly increased. The brine will cure almost every variety of uric-acid disease, both those belonging to the collæmic, and also to the arthritic, group. Ordinary cases are not as a rule put on special diet. The manager of one of the hotels informed me that he had noticed that most of the patients who had been ordered a vegetarian or uric-acid-free diet, after the first day or two went steadily through the hotel menu without missing anything. From my own observations I know he is right, and I am sure it is rare for the patient to restrict his diet notwithstanding the advice of the physician; however, they all seem to get cured at Droitwich sooner or later; so the diet question does not seem of vital importance when taking the brine baths. I am quite certain that if the patient is run down by constant pain, or otherwise debilitated, he will not stand a course of the brine baths unless he is well fed; as the brine promotes rapid and effective metabolism, it is obvious that the appetite must be increased. The town of Droitwich is not very attractive, but the surrounding country is charming, and there are sufficient amusements for an invalid. Droitwich is not a fashionable health resort like Harrogate, nor can it boast of such magnificent places of amusement: but then people go to Droitwich to get cured, and not simply to "take the waters."

Droitwich is the place to go to when the disease is serious, and Harrogate afterwards when the patient is convalescent.

Droitwich is seven miles from Worcester, and is easily reached from Paddington, on the Great Western Railway, the journey taking about two and a-half hours from London.

The salt produced by evaporation of the brine is of very little use, for it has lost its important *radio-active* property, and when re-dissolved, it merely furnishes a strongly alkaline bath.

Professor Wilhelm His, of Berlin University, says "That under the influence of radium emanation, the blood loses its uric acid within a few weeks." He also states "That experience, however, has long since taught us that it is not only the deposit of uratic salts which can cause an inflammation—a rapid solution of these salts may do the same. In the majority of cases, at all events, the radium treatment of gout is a very powerful remedy, even if some persons are refractory to the treatment." With regard to diet, he says, "I have never been able to satisfy myself that any special diet, or the limitation of meat, exercises a beneficial influence on the course of rheumatic affections. On the other hand, a dietetic treatment of gout is essential, even in conjunction with the employment of the radium treatment" In conclusion, it may be interesting to mention that patients sometimes complain that the pain in the joints is worse after the first two or three brine baths, and that they feel pain in other parts hitherto unnoticed. This is due to the rapid solution of the uratic salts which have been deposited in various parts of the body, and the pain eventually disappears as soon as the uric acid has been dissolved out and eliminated.

Lecture.[1]

FIELD AMBULANCES.

By Captain Wm. M. H. SPILLER.
Royal Army Medical Corps.
Adjutant R.A.M.C., School of Instruction, West Lancashire Division (T.F.)

Before discussing the various methods of handling field ambulances during actual warfare, there are certain points concerning these units to which I think your attention should be drawn. Field ambulances cannot be utilised in the manner intended by the War Office unless they are organised and equipped strictly in accordance with the various regulations, and further as the Administrative Medical Officer—*not* the Officer Commanding Field Ambulance—is the officer responsible for the tactical disposition of these units, the necessity for perfect organization must be apparent to you all.

In order that a complicated unit—like a field ambulance—can work satisfactorily, and in the manner intended, it is imperative that each man should know his own particular work. Further, it is necessary for your equipment to be packed in its proper place and loaded on its proper wagon.

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[1] Given to Medical Officers of the West Lancs. Division Territorial Force.

Peace time is the time to learn this; hence I would ask you to see that your sections are divided into their proper constituent parts, that every man is taught his own particular work, that every man knows the contents of his own particular piece of equipment and where to find it.

When—but only when—this pitch of perfection is reached, can your units be considered efficient.

An example may, perhaps, better illustrate my meaning.

Suppose, for instance, the Administrative Medical Officer orders a dressing station to be formed by No. 1 Field Ambulance. The Officer in Command of No. 1 details B section for the duty. The officer in charge of B section proceeds to the place ordered, with his tent subdivision, water cart, and forage cart. On arrival at the spot he commences to unpack his forage cart, but finds it loaded with baggage, tents, and supplies. What is the result? Chaos.

I lay stress on this point, as I find there is a tendency amongst you to consider only the medical side of your duties, and to say "Oh! that is the Quartermaster's business," or "the Transport Officer's business," or "the Serjeant-Major's business"; but you must remember that there is a very important military side to your work—probably more important than the medical side as far as field ambulances are concerned. Furthermore you have only one Quartermaster, one Transport Officer, and one Serjeant-Major, and as your unit consists of three sections, each of which will be self-contained in war, these officials cannot be present everywhere at once, and their duties will devolve on you. Here, again, is brought home to you the absolute necessity for perfect organization.

I should now like to say a few words about dressing stations, tent divisions, and collecting stations.

My excuse for doing so is the confusion which apparently exists—probably on account of your previous connection with volunteer bearer companies—with reference to these matters.

You will probably understand it better when I tell you that the present dressing station corresponds to the old collecting station, with the exception that the *personnel* stationed there is composed of the nursing section, &c., instead of a N.C.O.

The present tent division corresponds to the old field hospital, while the new collecting station had no counterpart in the old bearer company.

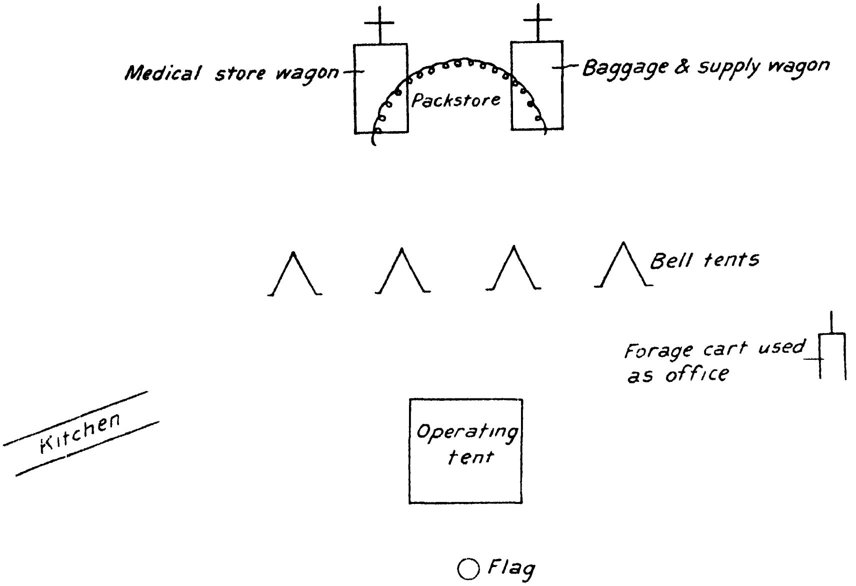
(1) *Dressing Stations.*—There seems to be an impression amongst you all that dressing stations are always furnished with tents. This is erroneous. A dressing station, according to "Field Service Regulations," Part II., Chapter X., and "Royal Army Medical Corps Training," Part II., consists of the *personnel* of one tent subdivision, with a water cart and forage cart, to which you may add your spare horses. Now if you look up the contents of a forage cart in "Field Service Manual (Medical)," you will

find no mention of tents. The "Royal Army Medical Corps Manual" further tells you how to prepare a dressing station (Part II., p. 9). I show you a photograph of a dressing station taken last year in Ireland. You will notice the hospital flag, forage cart unpacked, the water cart, the various medical and surgical panniers, the medical comfort panniers, ground sheets, &c. At the dressing station the cook digs his kitchen, and prepares hot drinks for the wounded, temporary shelters are erected, and if you again look up your "Field Service Manual," you will find that the forage cart is packed with implements for these digging operations.

But you may naturally ask: "What about performing operations at the dressing station?" In reply I refer you to "Field Service Regulations," Part II., Chapter X., and also to Major Spencer's book on "Gunshot Wounds," pp. 57, 58, 59, where it is stated that only operations for dangerous hæmorrhages and tracheotomies should be undertaken in field ambulances. Amputations should not be attempted (of course, trimming operations on limbs shattered by shells, where a few snips of the scissors suffice, are not amputations). Major Spencer further states that operations for dangerous hæmorrhages and for tracheotomies are rarely required, and as a matter of actual experience it would appear that beyond the application of dressings, the reapplication of the first field dressing if it has slipped, and the immobilization of fractures, little surgical work is required. Hence you will understand that dressing stations do not usually require tents: indeed, it is laid down that available buildings are to be utilized if such are necessary, and in this country, at any rate, there should be no difficulty in placing the dressing station in such a situation. You will further see that it would be wrong to put a tent in your forage cart.

(2) The Tent Division (or tent subdivision if only one section) is the most important portion of your unit, as on the efficiency with which it does its work depends the mobility of the unit. This is the place for the tents, but only if there are no available buildings. With regard to a tent subdivision, let us first consider the *personnel*. You will remember that besides the officers there are four serjeants (dispenser, steward, clerical, nursing—in A section the Quartermaster and Serjeant-Major perform the duties of two of the serjeants), two corporals (cook and packstore keeper), thirteen privates (seven nursing orderlies, three supernumeraries, one cook, one clerk, and one washerman), total nineteen (in A section two extra men, making a total of twenty-one). Each of these men should know his own particular business when a tent subdivision is required. You have four bell tents and one operating tent. To erect these one N.C.O. and fourteen men are required (two men to each bell tent and six men to the operating tent—the N.C.O. acts as director). This leaves five men. What are they doing? The cook should be digging the kitchen, one of the supernumeraries would certainly be signalling, the clerks and packstore keeper and remainder should be unpacking the transport, and the

former (*i.e.*, clerks and packstore keepers) arranging their offices and getting their returns ready. The offices may be formed with wagons and their tarpaulins. I have here a little sketch showing a tent subdivision which worked satisfactorily on the medical manœuvres at Tidworth last year.



When the tents are pitched they should be equipped with palliasses, lanterns, urinals, spit-cups, night-stools, bed-pans. The operating tent should be prepared with its operating table, acetylene lamp, medical and surgical boxes, the sterilizer set alight, and the dressings unpacked.

It may interest you to learn that all this can be accomplished—if every man knows his work—in forty-five minutes. From the above remarks it must be apparent to you all that in field ambulance work the old saying, "A place for everything, and everything in its place," is a *sine qua non.*

(3) Finally, a few words with reference to a "Collecting station." I regret I am unable to give you any very definite information on this point. In the "Field Service Regulations," Part II., Chapter X., we are given a definition of a collecting station, viz., "a well-defined spot, previously notified by the Administrative Medical Officer." We are also told that to this spot wounded "able to walk" are to be directed by regimental medical officers. Nothing is said about the medical *personnel* to be detailed for this spot, or the equipment with which it is to be provided. In the illustration of orders I will give you later on, I have

placed two collecting stations on the sketch, and also mentioned them in the divisional orders. Please do not take for granted that the collecting stations have been placed in the right situation, or that the *personnel* detailed for them is correct. I have only mentioned them in order to remind you that in certain cases they require to be published in orders.

I take it that they are meant simply to be places where very slightly wounded men can be collected together, and their first field dressings reapplied, before they continue their march to the dressing-station or tent division. If this be so, a very few men of the tent divisions ought to suffice for *personnel*.

The following points require elucidation: More exact information as to (1) their position; (2) *personnel* and medical equipment. It may, I think, be taken for granted that the Administrative Medical Officer would only be able to notify such positions in cases of battles fought on previously selected and defined ground.

Having, I hope, cleared up some false impressions, we will now go on with the various problems arising in connection with the evacuation of the sick and wounded. These problems may be tabulated as follows:—

(1) The manipulation of the various medical units of the force.

(2) The estimation of the probable number of casualties and their classification.

(3) The amount of transport required, and time necessary to remove the casualties.

The following remarks have no claim to originality. They are based solely on information obtained from various sources, but as you, being actively engaged in the business of your profession, have no time to avail yourselves of these sources, I have—in the hope that it may be useful to you—collected the information and placed it in lecture form. You will please remember that the subject of medical tactics is a comparatively new one in the British Army, and that even at the present time our military medical experts have not arrived at final conclusions on many of the points involved. I should like at this stage to acknowledge the very great assistance I have received, in compiling these lectures, from

NOTE:—Since writing the above few remarks on collecting stations, I have received the February number of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS. In that number there is a paper by Lieutenant-Colonel M. W. Russell, dealing with the medical services. In the course of his lecture he deplores the paucity of information regarding collecting stations, and although he agrees with my remarks as to its primary function, *i.e.*, "a slightly wounded station," he also looks upon it as an overflow station for the dressing-station, and a place to which medical officers of units should send their sick (not wounded) on the morning of an action. He is also of opinion that the field ambulances should empty their remaining casualties into it, so as to preserve their mobility. This, of course, necessitates a larger *personnel*, viz., a tent subdivision, and in addition hired labour could be utilized.

the papers in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS by Lieutenant-Colonel W. G. Macpherson, Major Wade Brown, Lieutenant-Colonel M. W. Russell, and also from the criticisms on the medical staff rides I have had an opportunity of perusing.

Let me again impress on you that the field ambulances of a division are *divisional* troops (three in number), commanded by the Administrative Medical Officer of the division, who is alone concerned with the movements and dispositions of these units. Further recollect that the mobility of the Army to a very large extent depends on the efficiency of the medical service, which in its turn again depends, as I pointed out at the beginning of the lecture, on perfect organisation.

(1) *The Manipulation of the Field Ambulances.*—The method of use depends on the military situation existing at the time, and hence varies according to this situation. Suppose, for instance, that the division is halting for a prolonged period. During this period the medical services will have no anxiety regarding wounded men, but will only require to consider the daily sick. Provided that there is no epidemic of disease, the amount of daily sick will average about 0·3 per cent (probably less). Taking a division as approximately numbering 20,000 of all ranks, the field ambulances would only have to deal with about sixty sick daily, *i.e.*, on the supposition that every sick man was to be sent from the fighting line. Whether the slight cases remained with the fighting line or not would of course depend on the immediate intention of the General Officer in Command. If all sick were not ordered from the front, the majority of the sixty daily sick would be very slight cases, with which the field ambulances would not have any concern. The minority would come into the field ambulance, and arrangements would require to be made to remove them to the rear. Hence, in such a situation as the above, the problem for the Administrative Medical Officer is twofold.

(*a*) Distribution of field ambulances for treating daily sick.

(*b*) Evacuation of the sick.

For the first purpose the Administrative Medical Officer would order one of the field ambulances to open a tent division at some central spot convenient for the whole division; or if the division be scattered, two tent subdivisions. For the second purpose he would arrange in communication with D.M.S., and his representative on the Line of Communication, for a clearing hospital, or a stationary hospital, to open at railhead for the reception of casualties from the ambulances. Slight cases will be kept at the stationary hospital, but serious ones would be transferred to the base.

(Remember that clearing hospitals and stationary hospitals are Line of Communication units, and hence outside the control of the Administrative Medical Officer.)

In the Territorial Army these last-mentioned units do not exist, so the Administrative Medical Officer would arrange for ambulance wagons, hired transport, or hand carriage, to convey casualties to the nearest railway station, whence they would be removed to a general hospital at the base.

En passant do not forget that the figure 0·3 per cent sick daily must always be budgeted for, no matter what the military conditions may be.

Next let us consider the handling of the field ambulances when the division is marching:—

(*a*) Without any prospect of fighting, ambulance wagons should be detailed to follow each unit, in order to pick up sick who fall out during the march. On arrival at camp the arrangements will be similar to those detailed above in the case of prolonged halts; but celerity of action, on the part of the medical authorities, will be very necessary.

(*b*) In touch with the enemy: Here the Administrative Medical Officer must bear in mind the advanced guard. He would allot to it a section of a field ambulance or part of a section, according to its size. (F.S. Regulations, Part 1, page 44). The field ambulance detachment marches behind the advanced guard and in front of the main column. The detachment allotted should include sufficient of the tent *personnel* to form a dressing station. Hence a forage cart and water cart must accompany the detachment. Ambulance wagons will also be required, to carry the casualties if the advanced guard fights a successful action.

The remainder of the ambulances would follow the main body, and when the main position of the enemy is reached, the Administrative Medical Officer would open a tent division or less according to requirements. On the other hand, in the event of a retirement, the wagons would bring the casualties of the advanced guard back with them.

In the February, 1911, number of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS you will find a communication from Major Mould suggesting that bearers are not necessary for an advanced guard, but only a dressing station detachment. He also suggests that the ambulance wagons should not be sent, as they are very conspicuous objects, but in their place local transport should be collected if possible by the officer in charge of the detachment.

Finally let us consider the method of utilizing the field ambulances.

(*a*) Our army acting on the defensive.

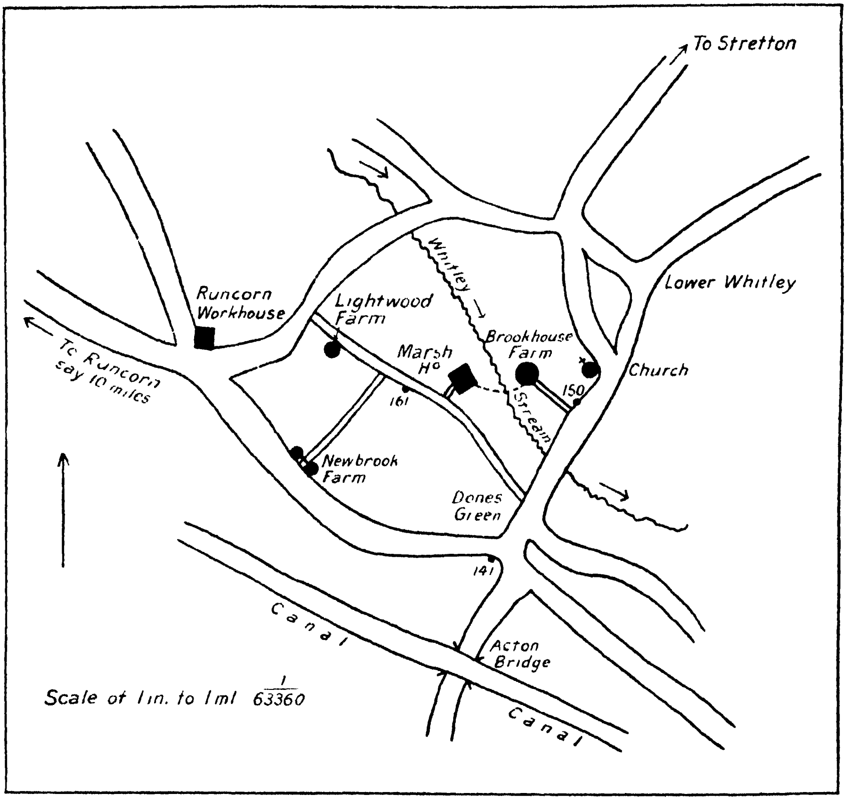
(*b*) Our army delivering an attack on a defended position.

In (*a*) the method of using the field ambulances is somewhat similar to that employed during prolonged halts, but in all probability every bearer division would be at work, and it would be necessary to open more tent subdivisions.

In (*b*) the three field ambulances would be concentrated by the Administrative Medical Officer near the attack, and casualties would be brought back direct to a tent division. It would not be necessary to open a dressing station except in case of a successful counter-attack.

In both these situations the Administrative Medical Officer would in all probability be able to indicate the position of collecting station (see p. 74 *et seq.*).

Before leaving this subject, please always observe the principle of keeping one or more of the field ambulances in reserve, till the point where the greatest number of casualties are is determined. Further, in the event of retirement the field ambulances in reserve would be available for removing casualties. As regards these the seriously injured should be left to the last, and if there be no time to remove these, a certain amount of material and a requisite number of the *personnel* of the tent division must be left with them (Geneva Convention, 1906).



As an illustration of these principles I show you a sketch of part of the O.S. map of Runcorn. Let us suppose that your division has been ordered by the General Officer Commanding in Charge to take up a defensive position extending from point 141 to the church ¼ mile north-east of point 150 on Lower Whitley—Acton Bridge Road. The General

Officer in Command of the division allots his fighting troops in his operation orders to certain areas of this position. He calls upon his Administrative Medical Officer for advice regarding the medical arrangements.

The Administrative Medical Officer in his capacity as adviser to the General Officer Commanding division, draws out a draft for insertion in operation orders of division. This order should *only* give such medical information as is necessary for the troops to be acquainted with. If approved, the draft is inserted in divisional orders above the signature of the General Staff Officer.

But the Administrative Medical Officer is also the Officer commanding the Royal Army Medical Corps of the division, therefore he also issues corps orders. These orders inform the various Officers Commanding the medical units in what manner the medical arrangements are to be carried out.

The divisional orders are sent to the General Officers Commanding the various Brigades, the Divisional Artillery and Divisional Engineer Commanders, the Officer Commanding Divisional Cavalry, the Officer Commanding Divisional T. and S. Column and Park, and the Administrative Medical Officer.

The Royal Army Medical Corps orders are sent by the Administrative Medical Officer to the Officers Commanding the field ambulances and the Medical Officers of the various units.

The Officers Commanding the field ambulances, on receipt of the Administrative Medical Officer's orders, issue their field ambulance orders. Illustrations of these orders are appended.

(1) Draft for Insertion in Operation Orders.........Division.
By Col. X—Y,
A.M.O. ....Division.

Reference O.S. 1 in. to 1 mile. Sheet 97. February 13th, 1911.

Medical arrangements. Two collecting stations will be formed: One at BROOK HOUSE FARM and one at NEWBROOK FARM. A dressing station will be formed at MARSH HOUSE. Ambulance wagons at LIGHTWOOD FARM.

The Tent Divisions of Nos. 1, 2, 3 Field Ambulances will be in open ground South of Cross roads in vicinity of RUNCORN WORKHOUSE.

The Bearer Divisions of Nos. 1, 2, 3, Field Ambulances will be on LIGHTWOOD FARM, DONESGREEN ROAD, at a point ¼-mile east of Point 161.

(Signed) X—Y.
Colonel R.A.M.C.,
A.M.O Division for A.G.

Notes on Above.—You will note in above draft the position of the ambulance wagons. I have placed them there on purpose; as the exact position of the ambulance wagons varies according to the configuration of the ground. They may sometimes be in front of the dressing station, sometimes at the dressing station, and sometimes behind the dressing station. They must be kept out of sight, otherwise they will give away the situation to the enemy. Note also that all the field ambulances are not in use. They may be wanted at any time; hence they are not opened till the occasion demands it. Note also that there are paths leading from collecting stations to dressing stations, that the dressing station is at a farm, close to a good road and near water.

(2) Royal Army Medical Corps Orders No. Copy No.
By Colonel X—Y,
Commanding R.A.M.C............Division.
GLEBE FARM,
February 13th, 1911.

Reference O.S. 1 in. to 1 mile. Sheet 97.

(1) The tent divisions of Nos. 1, 2, 3 Field Ambulances, less Dressing Station Detachment, will proceed to open ground South of Cross roads in vicinity of RUNCORN WORKHOUSE, and there await further orders.

(2) The Bearer Divisions of Nos. 1, 2, 3 Field Ambulances will proceed to a point ¼-mile east of Point 161 on LIGHTWOOD FARM, DONESGREEN ROAD.

(3) The Ambulance Wagons will proceed to LIGHTWOOD FARM.

(4) No. 1 Field Ambulance will form a dressing station at MARSH HOUSE.

(5) No. 2 Field Ambulance will furnish the *personnel* for the collecting stations at BROOKHOUSE FARM and NEWBROOK FARM.

(6) All movements to be completed at.........a.m. (Time according to to G.O.C.'s orders.)

(7) The A.M.O. will be at.......................where all messages should be sent.

(Signed) X—Y.
Colonel,
Commanding R.A.M.C. Division.

Issued at 10 p.m. by mounted orderly to O.C. Nos. 1, 2, 3 Field Ambulances.

(3) No. 1, Field Ambulance Orders. No......
By Lieut.-Col. A—B,
Commanding No. 1 Field Ambulance.
PLACE, February 13th, 1911.

O.S. 1 in. to 1 mile. Sheet 97.

(1) Reference, R.A.M.C. order, No.... .....d/ February 13th, 1911, the Tent Subdivision of "B" section, under Major............R.A.M.C., will form a dressing station at MARSH HOUSE. Transport allowed one forage cart and one water cart.

(2) The ambulance wagons of the field ambulance, with wagon orderlies under the orders of the transport officer, will proceed to Lightwood Farm.

(3) The remainder of the field ambulance will proceed to open ground South of Cross roads in vicinity of RUNCORN WORKHOUSE.

(4) All movements to be completed at............a.m.

(Signed) A—B,
Lieutenant-Colonel R.A.M.C.,
O/c No. 1 Field Ambulance.

Issued at 11 p.m. by orderly to O.C. "B" Section, "C" Section, and Transport Officer.

The above illustrations will give you a general idea of how medical orders are written and issued. Full information on this subject is given in Field Service Regulations, Part 1 (p. 22). Shortly, there are four kinds of orders issued in the Field, viz., standing, routine, operation orders, and messages.

Standing orders are issued by the A.G.'s staff. Their use is to prevent continuous repetitions, and to adapt regulations to local conditions. As far as the medical services are concerned, standing orders would deal with such matters as latrines, refuse pits, kitchens, water supply and conservancy.

Routine orders deal with discipline, interior economy, &c.

Operation orders deal with operations in the field. They are issued by the General Staff, who, as far as the medical arrangements are concerned, obtain the necessary information from the head of the medical service. Such information "as it is necessary for the troops to know" is inserted in the orders.

Detailed orders on the subject are issued by the Administrative Medical Officer to his subordinates. Messages may be sent by orderly (mounted or cyclist), telephone, signal, wire, or by post. If by signal, use A.F.C. 2121. Messages, if not sent by signal, should be written by the sender in A.B. 153 and enclosed in an envelope.

The proper way of writing a message is indicated in the following example, in which note, that if your message is in answer to another message, the number and date of that message should be referred to. Always number your message and give time of dispatch and how dispatched.

Example of message:—

Colonel SMITH, A.M.O.......Division.
GLEBE FARM.

No. 10. February 14th, 1911. In reply to your No. 15, d/14/2/11, there are twenty (20) seriously wounded cases at RUNCORN WORKHOUSE: Four can NOT be moved, sixteen (16) require lying down accommodation.

(Signed) JOHN JONES,
Major, R.A.M.C.,
O/c Tent Division ("B" Section).
No. 1, Field Ambulance, RUNCORN WORKHOUSE.

Despatched by cyclist orderly, 3.30 p.m.

6

The following rules in connection with orders, messages and *reports* may perhaps be useful to you :—

(1) Always keep a copy of your message.

(2) „ use A.B. 153, if available.

(3) „ write numbers in words.

(4) „ „ names of persons and places in block capitals, *e.g.*, LIVERPOOL; also word not = NOT.

(5) If a map be referred to, specify the one used.

(6) Always read over your message before despatching it, to see if it is precise, concise, and easily understood.

(2) *Estimation of Probable Number of Casualties.*—This estimation is required before and after big engagements, in order that the requisite amount of transport may be collected together, and also in order that the time taken to clear the advanced field medical units may be approximately gauged.

As already indicated, it may be taken for granted that at all times there will be about 0·3 per cent daily sick (probably less). The majority of these will be trivial cases, but trivial or not, if a battle be imminent they must be removed from the fighting line to a stationary hospital.

In a pitched battle the number of wounded will vary from 5 per cent to 20 per cent (Field Service Regulations, Part II, Chapter x), and of this number the proportion of killed to wounded may be taken as one to four. The wounded cases should be divided into the following classes viz., walking cases, *i.e.*, wounded who can retire without assistance, 20 per cent; lying down cases, *i.e.*, those requiring lying down accommodation, 15 per cent; sitting up cases 60 per cent, and cases which must not be moved 5 per cent.

Taking, for example, 1,000 casualties we would approximately have 200 killed and 800 wounded; of the 800 wounded, 160, or 20 per cent, would be able to walk; 120, or 15 per cent, would require lying down accommodation; 480, or 60 per cent, some sort of sitting-up transport, and 40 or 50 per cent, could not be moved. These figures are taken from a paper by Colonel Macpherson,[1] and I think are now practically agreed upon by all authorities.

(3) *Estimation of transport required and amount of time necessary to remove casualties.* In Colonel Macpherson's paper mentioned above two formulæ are given for the purpose of working out such problems.

Personally, I can never remember formulæ, and I find it easier in answering such problems to draw a rough sketch of the situation and a form as follows: filling in on the form and sketch the data given in the question, and then solving the problem without the aid of formulæ. At this stage of the lecture hectographed copies of the two questions given in the above paper were handed to the officers, and the questions worked out on the blackboard.

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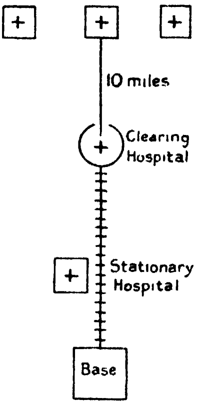
[1] "The Removal of Sick and Wounded from the Battlefield." By Colonel W. G. Macpherson, C.M.G.

	Sketch	Casualties	Classification	Transport available	Maximum accommodation	Time taken for return journey	Time allowed	Amount of vehicles required
A	 + + + 10 miles + Clearing Hospital + Stationary Hospital Base	300	60 L. D. 240 S. Up	A. wagons G S. ,, Country carts	4 L. D 12 S. Up	1 day from A to B and return		?
B		200	40 L. D. 160 S. Up	Trains— (*a*) Ambulance (*b*) Ordinary	100 L. D 400 S Up	1½ days from B to D and return	3 days	
C		500	100 L. D. 400 S. Up			1 day from C to D and return		
D								

First question in above paper.

As you may be asked to go on medical staff rides, I think you will find the following suggestions useful. The first task given you before the beginning of the ride will be to write as D.M.S. an appreciation of the situation as it exists from the medical service point of view. This appreciation should contain such matters regarding the medical services of the field force as the General Officer Commanding in charge must be acquainted with. It should be so compiled as to indicate to this officer precisely and concisely the proposed situation of the various medical units in the three "medical zones," the proposed line of evacuation for casualties, and the means proposed to accomplish this evacuation. In addition the appreciation should include suggestions on such matters as sanitation, clothing, food, and extra equipment.

The following headings are suggested, viz. :—

(1) Position of troops and base.

(2) Strength of troops in officers and men.

(3) Object of medical services.

(4) Field medical units for the force and the hospitals on line of communication. Their number and position in the zones of medical assistance. The *personnel* of the medical units and number of beds available.

(5) Probable number of casualties and their classification.

(6) General line of evacuation.

(7) Arrangements in connection with this evacuation.

(8) Conditions likely to affect health of troops.

(9) General remarks, *e.g.*, on sanitation, &c., clothing, food, equipment.

Remarks on above headings: The position of troops will be found in the scheme sent you before commencement of the ride. The strength of the force can be found in war establishments. The number of field medical units allowed for the force is indicated in Field Service Regulations, Part II, and the *personnel* of these is given in war establishments. We have already discussed the probable number of casualties and their classification. As regards the line of evacuation of the sick, the appreciation should indicate at what station (if any) the casualties will be entrained, and by what railway and to what station removed. If canals or rivers are available for evacuating purposes they should be utilized in conjunction with the railways, or in their stead if no railways exist. Water carriage affords the best means for removing seriously wounded cases. Do not forget that under the Geneva Convention, 1906, seriously wounded cases may be left behind in the event of a retirement, provided sufficient *personnel* and equipment remain with them.

In connection with the arrangements to be made for evacuating, the D.M.S. through the A.G. should arrange with Director of Transport and I.G.C. through the Q.M.G. Staff for the use of empty supply wagons—returning to depots—to assist in conveying casualties back to clearing hospitals and railhead; and Administrative Medical Officers should be informed of arrangements made, so that these wagons can be collected together at suitable times and places by the Senior Transport Officer of the Division. The Director of Railways should be asked to have an ambulance train ready to leave railhead at specified times; also to arrange for ordinary trains or covered trucks to be ready when necessary. This officer should issue time tables, and inform the Representative of the Director of Medical Services on the line of communication.

Conditions likely to affect the health of troops would be such conditions as inclement weather, forced marches, untrained body of troops —*e.g.*, Territorials or recently called-out reservists.

General remarks — as, for example, sanitary remarks — might be attached to the appreciation as a memorandum, and this if approved could be inserted in Standing Orders.

During the course of the staff ride you may be made Administrative Medical Officer of a division, or Officer Commanding one of the field ambulances, or be asked to make a report on a town or village as regards its medical possibilities. We have already discussed the duties of an Administrative Medical Officer and Officer Commanding field ambulance and the form of orders issued by them.

I now give you a few hints on the medical reconnaissance of a town. Remember that in writing reports the same rules are in force as exist in case of orders and messages. If asked to locate a position for a clearing or other hospital, state generally in your report its situation, as, for example (fine grass land in Lord Y. estate, 2½ miles north-east of railway station). Then mention the approaches to it, if good or bad; water supply, &c.

A medical reconnaissance of a town should include information on the following points:—

(1) Number of hospitals, specifying the variety and their capacity for receiving casualties at the time.

(2) Number of buildings suitable for hospitals—*e.g.*, hotels, boarding schools, nursing homes, which, though fully equipped with beds, bedding, and cooking and other utensils, would require to be supplied with a nursing staff, and medical and surgical stores.

(3) Number of buildings suitable for hospitals—*e.g.*, public halls, churches, which would not have adequate sanitary arrangements, no medical or surgical equipment, or beds, bedding, &c.

(4) The local resources for the supply and fitting up of sanitary arrangements.

(5) The local resources for the supply of drugs and surgical appliances.

(6) The local resources for the supply of beds, bedding, and utensils.

(7) The local resources for the supply of transport—*e.g.*, trams, cabs, 'buses, &c.

(8) Number of medical men and trained nurses. The presence or absence of a branch of the Red Cross Society.

(9) Amount of labour which can be obtained if required.

(10) The railway station as regards its facilities for entraining casualties. The report on the railway station should include such information as number of lines; number and length of platforms; number of sidings, and if the sidings are provided with platforms; accommodation provided at sidings for wagons and coaches; lighting arrangements; if there is a shed suitable for a rest and refreshment station; latrine accommodation; water supply, its source and method of supply; if a tank, its capacity and length of time required to fill it.

(11) The water supply of the town.

LECTURE ON THE WORK OF A QUARTERMASTER IN THE FIELD.

By Captain and Quartermaster H. SPACKMAN.
Royal Army Medical Corps.

On mobilization being ordered the Quartermaster would at once proceed to the place of assembly of his unit, and for the purposes of this lecture we will assume that he has been posted to a Field Ambulance.

Ordnance Stores.—His first duty would be to get in touch with the Army Ordnance Department by a personal visit to the Ordnance Stores to see that the equipment is ready, and to ascertain what arrangements have been made for its issue. If the field ambulance is about to embark for service abroad it would be taken over at the Ordnance yard, and probably loaded straight into railway trucks for transport to the port of embarkation. I may at this point say that my experience has taught me that the equipment is invariably correct and in perfect order.

To obtain this equipment no requisition is necessary, for it is issued on Army Form G, 1098-63 which answers the double purpose of store tables and receipt and delivery vouchers. The equipment required for each section of the field ambulance is enumerated separately, the total being given in the last column. It will be noticed that there is very little difference in the quantities allotted to each section. The fact of Section "A" having an additional ambulance wagon will account for that section holding on charge more picketing gear, nose bags, horse brushes, &c. The scale is calculated on the assumption that blankets, except for the sick, are not required, and that buildings will be available for their accommodation. But, if specially ordered, blankets for personnel (one per man), additional tents for accommodation of the sick, or both, and additional transport to carry them would be drawn. One extra forage cart per section is allowed for the additional tents and blankets.

Fitting of harness and saddlery on mobilization and the repair of equipment and shoeing of animals on active service, are carried out by the artificers of the Divisional or Army Troop Transport and Supply Column (see note 6 on Army Form G, 1098-63).

If repairs of ordnance equipment cannot be done regimentally, Army Form G, 1045 should be submitted to the nearest Ordnance Officer, who will issue instructions. On the field the advanced Ordnance Depot is not very far behind, and although it does not do much in the way of repair, you can always rely on getting new wheels, tent pegs, tent poles, &c., when required.

Saddlery is not stored during peace for officers who are only mounted on active service. It is asked for separately on Army Form G, 997 from Army Ordnance Department, quoting for authority the order for mobilization.

This, I need hardly say, is a most unsatisfactory state of affairs, for although in all probability the Ordnance would be able to meet the requirements of those field medical units that were amongst the first to mobilize, the supply of saddles would be sure to give out owing to the enormous calls that would be made on them by other units, Regular and Territorial, and the medical officer would probably be given a money allowance to provide his own saddle, which might mean leaving his unit for a day, at a time when his services were much wanted, to proceed to a town to make the necessary purchase. Saddles ought to be stored in the same manner as all other equipment.

During the South African campaign colonial saddles were issued to our officers on arrival in that country, and very good saddles they proved to be.

Medical and Surgical Equipment.—The medical and surgical equipment is held in medical mobilization stores, or in Army Medical Stores, Woolwich, and is sent to the places of mobilization of units. Indents are not necessary. For scale, see Appendix 50, "Regulations, Army Medical Service," or Appendix 4, "Field Service Manual" (p. 72).

N.B.—These articles do not appear in mobilization store tables.

Veterinary Equipment.—The veterinary equipment is held on charge by the Army Veterinary Department, and is issued on mobilization under arrangements made by the War Office.

Indents are unnecessary. It consists of :—

1 veterinary chest for Section "A."
1 ,, wallet ,, "B."
1 ,, ,, ,, "C."

Though issued by the Army Veterinary Department these items appear in the store table.

For contents see Appendix 31 and 32 (p. 113) "Field Service Manual." On p. 114 of the "Field Service Manual" will be found some instructions for using these stores.

They should be placed in charge of the senior N.C.O. of transport when no officer is appointed.

Grocery Panniers.—Empty grocery panniers are supplied by the Army Ordnance Department. To complete them draw from the supply depot, see Appendix 1, (p. 67) "Field Service Manual."

It will be observed that the soldier carries a half ration of meat and biscuit, and the pannier contains two days' groceries for him.

Medical Comfort Panniers.—Medical Comfort Panniers are now held on charge at certain large hospitals, ready stocked for issue on mobilization. Six are allowed for a field ambulance, being two per section. For contents see Appendix 3 (p. 70), "Field Service Manual."

They can be replenished on the field from the supply depot. During the South African War, it was found that the quantities of medical comforts carried in the panniers were quite insufficient, even although the supply depot was only a few hours' ride behind. A couple of hundred wounded admitted after a battle would use all the milk and bovril at once, it was therefore found necessary to carry cases of milk and bovril on the wagons.

Field Dressings.—Field dressings have also to be demanded from the Royal Army Clothing Depot for the full strength of the unit. See paragraph 15, part 3, "Clothing Regulations." Every man is supposed to have a field dressing in a pocket specially provided just inside the right side of the skirt of his service dress jacket.

Emergency Rations.—Emergency rations are supplied from the Army Service Corps Supply Reserve Depot, Woolwich. Indents are unnecessary. They are replenished on the field from the supply depot as required.

One emergency ration would be carried in the haversack by each soldier on service. The ration is never to be eaten except by the order of an officer, or when in extremity.

Brassards.—Brassards are stored at the Royal Army Clothing Depot and issued on demand. They are worn by officers and men as well as by the Army Service Corps attached to the field ambulance. The requisition for these would be one of the first sent in by the Quartermaster on joining

Hospital Clothing.—Boots, pairs 20, aprons (operating) 18, jackets (flannel sleeping) 60, and trousers (pyjamas) 60, will be issued to the officer in charge at place of mobilization by the Royal Army Clothing Depot, and will be replaced in the field by the Army Ordnance Department as required. They are not included in the mobilization store table. Attention is invited to paragraph 35, "Clothing Regulations," part 3.

Rations.—Officers draw the same rations as men on active service and also at certain stations abroad. They are demanded from the Supply Depot on A.B. 55. The scale is bread 1¼ lb., fresh meat 1¼ lb., or preserved meat 1 lb. Biscuits are as a rule issued in the field in lieu of bread, but when the troops remain for any length of time at one camp, the field bakeries are got to work and all things considered turn out very fair bread.

Groceries are issued as per scale drawn up by the War Office, or by the General Officer Commanding. Rum and lime-juice are issued at the discretion of the General Officer Commanding on the recommendation of the medical authorities.

In camps at home, Army Form F, 743, certificate of rations issued, is furnished by the Officer in Charge Supplies.

Forage.—The first and last charge for forage on Army Form F, 718 monthly forage account, is supported by Army Form O, 1640, which is a certificate of the date the horse was last foraged by its former unit. It also contains the date of shoeing and certificate of fitness by the veterinary officer. You are not, however, troubled with these forms during active operations, as the forage is indented for on the ration book already mentioned, *i.e.*, A.B. 55.

Fuel.—Nominally no fuel is carried, except the wood of the ration boxes which will be issued for kindling purposes only and supplemented by fuel obtained locally.

The question of finding fuel is an unceasing anxiety to the Quartermaster, who will, if he is wise, pick up every stray piece of wood he comes across and load it on his wagons, for on arrival in camp, the officers and men want their dinners and hot drinks. In South Africa ant-heaps were found to make capital stoves.

Candles and Oil for Lamps.—There is no scale for candles and oil for lamps in a field ambulance. They are drawn as required from the Supply Depot, requisition is made on A.B. 55, or on A.B. 30. It is as well to requisition for a supply of these articles immediately on mobilization, and fill up the tins that will be found in the panniers. Some units started off to the last war without filling their tins, and arriving in a camp up country before the Supply Depot had settled down to work, were much inconvenienced by the omission.

Latrine Paper.—Before embarkation a supply of latrine paper should be requisitioned from the nearest Officer in Charge of Barracks. This is a point that might easily be overlooked.

Equipment Ledger.—An equipment ledger must be kept, although it is omitted from Appendix 33, "Field Service Manual."

On board ship when going out the Quartermaster will have plenty of time to enter up all the vouchers he has received.

In connexion with the equipment ledger a very important form is Army Form P, 1925. It is called an expense voucher, and at the end of each month all expendabie articles used are struck off charge on this form. If red ink is available all receipt vouchers should be numbered with it, as the auditors like it.

Advanced Depot of Medical Stores.—After an engagement has taken place and dressings have been expended to some extent, the panniers should be replenished from the advanced depot of medical stores, which is usually not very far away, and from which you can obtain on requisition, without having the approval of the Administrative Medical Officer or Principal Medical Officer, any stores you want. Sometimes the depot is in railway carriages, and if the troops leave the line of rail it will be found in a wagon or wagons. At Colenso the advanced depot was on the railway alongside the battle-field.

Feeding of Sick and Wounded.—It may be asked how are the sick and wounded fed when they remain with a field ambulance long enough to require something more substantial than bovril and milk? In that case field rations are indented for in the same way that rations are drawn for the *personnel;* the words "for sick," are written on the requisition, and the number of rations required is stated. As a matter of fact after a while it becomes a custom to carry a couple of cases of biscuit and a case of preserved meat on the wagons, and these, together with the groceries contained in the medical comfort panniers, will suffice for a sudden influx of wounded. A wounded man will be found to have just as good an appetite as a sound man when his wound has been properly dressed and he has got over the shock of the injury. In some cases, of course, the regiment will hand over the rations of their wounded men, but reliance cannot always be placed on this being done. In the field a few overdrawn rations are of small account.

Clothing of Personnel.—When a soldier goes on active service he ceases to draw clothing and kit allowance, and is supplied with all he requires free. He marches up country with just what he stands upright in, and a few necessaries that are carried in the pockets of his great-coat. After a soldier has been in the field for two or three months and there is a lull in the fighting, and the exigencies of the service permit, the pair of boots, second suit of service dress, second shirt, socks, &c., he has left at the base will be sent up to him. Any further clothing that is required, such as boots, service dress jacket and trousers, will be obtained for him by the Quartermaster, who will indent on the Ordnance Officer for them.

Losses.—Even in the field losses and damages have to be dealt with in accordance with King's regulations as far as time and circumstances will admit.

In the event of loss or damage the Officer Commanding will decide on whom the loss shall fall. If, in his opinion, the loss was unavoidable, he will report the circumstances and ask for a Court of Inquiry if necessary. In every case where the value of the article lost is £10 or over, he must report to higher authority. Articles lost are struck off ledger charge supported by Army Form P, 1925, expense voucher. The proportionate value of articles is ascertained in this way ; the present value of the article equals its value when new, divided by months of life, multiplied by the months of unexpired use. Losses of medical and surgical equipment are struck off charge on Army Form I, 1230.

Priced Vocabulary of Stores.—The Ordnance system of nomenclature —*i.e.*, Woolwich store charge—must invariably be used on all indents, and on all vouchers when returning stores. This will not cause much trouble as the receipt vouchers from the Ordnance show the correct sections filled in, and it is only necessary to copy from them when returning stores.

N.B.—The Woolwich store sections were revised a few years ago, and, so far, no new ledgers have been printed, so that the sections shown in the ledger are nearly all wrong, and have to be amended when using the ledger.

Requisitions.—In preparing requisitions on the Ordnance, remember to use Army Form G, 997. A separate form is required for each Woolwich store section.

Returning Stores.—Army Form G, 1033, is used for returning stores; a separate form is rendered by each section. It should be sent to the Ordnance Depot in triplicate.

Patients' Valuables.—The regulations say that the valuables of patients should be at once sent to the Corps, if possible; otherwise they should be transferred to the Clearing Hospital. In the case of deceased soldiers they should be sent to the Officer Commanding the regiment. If this cannot be done they should be forwarded to the Officer in Charge of Base Records. Valuables include the pay book and identity disc.

The lists should be made out in triplicate. One is retained as an office copy, two go on to the Clearing Hospital—one of these will come back signed by the officer taking over the valuables, and should be most carefully preserved, as questions as to the whereabouts of valuables will often crop up years afterwards.

Taking a common-sense view of this question it will be seen that it is best to avail ourselves of the alternative method of disposal—*i.e.*, sending them on to the Clearing Hospital, as a commanding officer in the fighting line does not want to be encumbered with the valuables of men who have become non-effective, and are of no further use to him.

Arms and Accoutrements.—The regulations say "return arms and accoutrements at once to the regiment; otherwise transfer them with the patient to the Clearing Hospital, or hand them into the nearest Ordnance Depot." Hence, there are three methods of disposal open to us. The first is out of the question as a rule, for the regiment, having lost the man, does not want to carry his rifle about, &c., on its already overloaded wagons. Very often the advanced Ordnance Depot is not far behind, and it is an easy matter to send them there—perhaps in the cart returning to draw rations. Army Form G, 1033, must be prepared, and in all cases a record must be kept. It may of course be better to transfer the arms with the patient to the Clearing Hospital, as it is more likely to be situated nearer the advanced depot of Ordnance stores. It is most important that the Quartermaster should make arrangements to have the rifles properly cleaned immediately they come into his possession.

Echoes from the Past.

SURGERY OF THIRTY YEARS AGO.

AN INTERESTING CASE.

BY SURGEON-MAJOR-GENERAL A. F. BRADSHAW, C.B., K.H.P.
(Retired Pay).

THE following is an abstract of notes, made at the time, of a case which I met with over thirty years ago; it was very interesting to me then, and perhaps it is worthy of being placed now on record in print.

On August 3rd, 1879, being then on duty in a Himalayan hill station, a hurried message summoned me to see a young man who had shot himself. I found the patient insensible, and with a starred and bluish-edged wound in the forehead about ½ inch above the root of the nose and in the middle line; I was informed that blood had spouted "as from a squirt." After awhile consciousness was regained, accompanied with struggling, vomiting and a complaint of a "sting" in the forehead, also of pain constant and at times acute in the back of the head. There was much surface tenderness, even to light touch, on the nape of the neck and down the shoulders, more on the left side.

Except for inflammation of erysipelatous character, slight in extent and transient in duration, of the forehead and eyelids, the case progressed uneventfully; as a rule the temperature was one or two degrees only above normal, the pulse full and regular and numbering between 60 and 70, sight and hearing good and mental faculties apparently undisturbed, discharge from the wound purulent, some frontal headache at night. On the 25th evening the temperature rose to 107°, the pulse rate being only 48, the tongue a sodden white; much headache was experienced on any movement of the body. All these symptoms subsided next day. Twenty days later the note was: wound still discharging, patient who had drifted into a state of dull apathy was reviving somewhat, faculties clear and pulse good; had been taken out for airings. Twenty-one days afterwards (October 4th) he fell down and jarred his brain, but did not strike his head; he had frequently of late passed water involuntarily and been dull and listless. Next day feverishness recurred. The following day his breathing was stertorous, he could be roused to dim consciousness, there was some tonic spasm of the muscles, the pulse varied between 60 and 100, thick pus exuded from the wound. On the 8th he was much better, free from fever and quite conscious. Later, the fever returned, the consequence, it was thought, of a chill in the first instance, but on the 15th he had greatly improved, the discharge being thinner and less, the faculties were dulled, however. On the 18th congestive rushes to the head were observed and tonic spasms. Next day death occurred before dawn, two and a half months after the accident with the pistol.

It may be mentioned here that the wound was probed on at least three occasions, with finger tip or with the ordinary silver probe; the latter could be introduced about ½ inch, but the location of the bullet could not be determined. Consultations were held and the expediency discussed of enlarging the wound in the os frontis to search for the foreign body, but it was considered unsafe to explore the cerebral cavity, the progress of the case having suggested the inferences that the bullet had entered the brain and that any operative measure would be more than likely to add to the existing danger to life. Nine hours after death the head was opened. In the frontal sinus and close to the crista galli the bullet was found loosely lodged; it was cylindrical, flattened fore and aft, and weighed 130 grains. The inner wall of the sinus had been burst open; the dura mater had not been pierced, but many splinters of bone were adherent to it, and the area of ulcerous inflammation measured about 1½ in. by 1 in. There was no implication at all of the adjacent brain substance.

At this stage of the examination two men friends of the family were called in to see the condition of affairs. They were shown the bullet, the injuries to the frontal bone, and the entire absence of affection of the neighbouring brain surface was pointed out. By way of demonstrating the healthy state of the brain generally I passed the dissecting knife into the frontal lobes, when greatly to my surprise greenish pus welled up freely from the left. I estimated the quantity at 2 oz., and found that it had been contained in a sac having thick and dense walls; the brain environing the sac was quite normal, and there was not any trace at all of connection between the sac and the frontal sinus injury. So thorough was the encapsulation of the abscess as to make it more than reasonably certain that the suppurative inflammation collection had pre-existed for a considerable time. This very strong probability was really comforting to the relations of the deceased, inasmuch as it appeared to explain that his conduct, which had caused them much regret, had been owing to brain disease, and not to "*mauvais sujet*" disposition.

There did not seem to be any doubt as to the cause of the wound having been accidental. The patient disclaimed any intention of voluntary infliction. He was, while seated, indolently leaning forward and carelessly fingering the pistol, a pocket derringer, when it went off, such a firearm being usually kept loaded.

The medical history of the patient was not well ascertained. He was in Government employ in the plains, and having become weakened in general health by heat of climate and some illnesses, he had come up to the hills to recruit.

The actual cause of death was taken to have been exhaustion. The very violent concussion of the brain by the penetrating impact of the bullet on the frontal bone and the prolonged local irritation of the cerebral membrane were held to have worn out the vital powers previously enfeebled by climate and ill-health.

Reviews.

THE PREVENTION OF MALARIA. By Major Ronald Ross, C.B., F.R.S. With contributions by Professor Celli, Colonel Gorgas, Dr. Edmond Sergent, &c. London: John Murray, 1910. Pp. 669. Price 21s. net.

This volume will be warmly welcomed by all who desire to bring their knowledge of malaria prevention up to date and to possess a work which affords a critical summary of the voluminous literature which has recorded the experiences of the last few years. It is a matter of congratulation for such that Major Ross has himself undertaken this work, since it need hardly be said that no man is entitled to speak upon it with greater authority.

The general scheme of the book is to present the subject in such fashion as will enable the medical officer of health, the civil administrator of a district, or the individual who merely wishes to avoid infection in his own person, to obtain the most recent experience which is available on any particular point. This has been accomplished by the avoidance of unnecessary technical details and by the clear and systematic manner in which the many-sided problem of malaria prevention has been dealt with. At the same time, although the layman will find much that will be of the greatest assistance to him, the book is full of most interesting and suggestive matter which will be new even to many whose technical knowledge of the subject is extensive.

The author purposely, and we think rightly, avoids any detailed description of the parasites themselves, such descriptions being available in every text-book of tropical disease, and lays most stress on the various factors which bear upon the conditions of infection both of the mosquito and of man. He devotes considerable space to his well-known researches in connexion with the more exact mathematical study of the disease, and shows clearly how important are accurate quantitative enumerations of the number of parasites in a patient's blood, of the proportion of mosquitoes likely to become infected by feeding on cases of malaria, of the mosquito population of a village or district, &c., &c. These and many other observations he shows to have a most intimate and important bearing on the particular preventive measures which should be selected in a given instance and on the success or failure which may be anticipated from such measures.

Much stress is laid upon the need for an accurate estimation of the amount of malaria present in a district as an essential preliminary to an anti-malaria campaign, the alternative methods are discussed at length, and the author concludes that the most generally useful of these is the spleen-index.

The second half of the book is occupied by contributions from various authorities who record their personal experiences of individual campaigns or of special branches of the subject. For instance, Professor Celli deals with the struggle against malaria in Italy, Colonel Gorgas with the very successful campaign against malaria and yellow fever in the works of the Panama Canal, while Lieutenant-Colonel C. H. Melville has an interesting article on the prevention of malaria in troops in war or during peace, and Major C. E. P. Fowler gives an account of the Mauritius campaign in which he was associated with the author.

The book is a most valuable one and may be strongly commended to all whose duties bring them into contact with malaria.

W. B. L.

URINARY SURGERY: A REVIEW. By Frank Kidd, M.B., B.C., F.R.C.S. London: Longmans, Green and Co., 1910. Pp. xvi + 429. Price 7s. 6d. net.

It is a little difficult to place Mr. Frank Kidd's interesting review of Urinary Surgery during the last decade. He hopes that the work may be useful to students preparing for the higher examinations, but, from the purely examinational point of view, the opinions and practice of the expert and leader in any particular branch of surgery are not necessarily acceptable to an examiner with a bias for tradition.

The work is in five sections, devoted respectively to kidney, ureter, bladder, prostate, and urethra. There is also a short appendix dealing with the origin of renal calculi, with special reference to the nature of colloids.

In the kidney section, after chapters on the examination of a urological case and on the development of the kidney, injuries and moveable kidney are considered, and then follow chapters on stone and the results of inflammation and of invasion by new growths and by the granulomata. The section ends with a reference to the surgical treatment of Bright's disease.

The ureteric section deals with abnormalities and malformations, calculi, inflammation and fistula, injuries and tumours. Naturally this section is short, as a good deal of the ground has been already covered in dealing with the kidney.

The bladder section opens with consideration of rupture and of foreign bodies in the bladder, followed by chapters on calculus, inflammation, tubercle, ulceration, tumours, and disorders of the bladder function, and ending with one on bilharziosis.

The prostatic section is chiefly devoted to enlargements, fibroadenomatous and malignant, the remainder of the section dealing with inflammation, acute and chronic, tuberculosis and calculi.

Stricture, organic and traumatic, fills the first two chapters of the urethral section, and the remaining two deal with the treatment of retention of urine and the choice and sterilization of catheters and bougies.

It will thus be evident that all aspects of renal surgery are dealt with, though sometimes the arts of compression are more evident than those of selection. Mr. Kidd takes the standpoint of the expert, and assuming the expert's dexterity with the cystoscope and the ureteric catheter, mercilessly rules out the more easily acquired manipulative powers of catheter and sound. Still, the assumption of a high standard in diagnosis undoubtedly may lead to that "participation of the practitioner," which Mr. Kidd rightly states to be "imperatively required," if the benefits to be derived from the improvements in urological diagnosis in the last decade are to be enjoyed by the public at large. E. M. P.

MODERN SURGICAL TECHNIQUE. By C. Yelverton Pearson, M.D., M.Ch., F.R.C.S. London: John Bale, Sons and Danielsson, Ltd., 1910. Pp. xix + 484. Price 10s. 6d. net.

The second edition of Professor Pearson's handbook has been revised and thoroughly brought up to date. Additional matter to the extent of nearly 100 pages and some new illustrations are also to be found. In its present form the work should prove a valuable guide to the young surgeon, as the details of technique are clearly given, there is no fog of conflicting opinions and the author in most cases clearly lays down the procedure which he prefers.

The work is in four parts. It will be sufficient in a book so well known to indicate briefly what is new. The first part includes chapters on surgical bacteriology, the nature of infection, disinfection, and the germicides and antiseptics used in surgery with their methods of preparation. There is also a new chapter on the standardization of disinfectants, giving some account of the results obtained by the *Lancet* commission in November, 1909, and the valuable and suggestive conclusions arrived at by that body of workers. We agree with Professor Pearson that an organized State system of standardizing disinfectants is loudly called for, in spite of the many difficulties involved. In the chapter on infection, the section on immunity has been rearranged, phagocytosis is mentioned, but the very complex subject of alexines has not been touched upon, a wise discretion no doubt in a work of this character. In Notter and Firth's "Hygiene," an unfavourable opinion of the value of fumigation as usually practised is expressed. This opinion is quoted in the chapter on disinfection, and also the properties of the ideal disinfectant from the same work. In the chapter on germicides the properties of the various antiseptics used in surgery are dealt with, new substances mentioned being silver iodide, pyoktanin, menthol and thymol and the essential oils. This part closes with a useful chapter on the preparation and properties of antiseptic solutions, emulsions and pastes. A large amount of new matte has been introduced, which will well repay careful perusal.

The second part deals with prophylactic disinfection. Chapter VIII, on hand disinfection, has undergone a good deal of rearrangement. The difficulties of hand disinfection are tabulated, and the various methods, including the author's own, of attaining that end are described, especial stress being laid upon the value of iodine. There is a helpful discussion on the question of wearing gloves, and the best method of using them. The rest of the operator's and his assistants' outfit is then considered in detail, most of this part being new matter, and the chapter ends with the procedure for the disinfection of the patient's skin, Grossich's iodine method and its modifications being described. The preparation and sterilization of instruments is next considered, with useful hints on the prevention of rusting, and the sterilization of knives and needles. Professor Pearson thinks that the day of marine sponges may return, and accordingly he gives directions for their sterilization, cleaning and upkeep, as well as advice regarding swabs, pads, packs and other artificial substitutes. Ligatures and sutures, absorbable and non-absorbable, form the subject-matter of the next chapter. The sublimate method of preparing catgut has been abandoned, and a full description of the iodine method is given, and when hardening as well as sterilization is required the uses of formalin, chromic acid and chromium sulphate are indicated. This part concludes with three chapters on absorbent dressings, antiseptic dressings and the sterilization of water. There is nothing which is new.

Part III is called Wound Technique. It contains five chapters, one on the nature and treatment of wounds, one on the means of arrest of bleeding, two on materials and methods of suture, and one on drainage. There is no great amount of new material in this part. There is a little variety in the needles and needle-holders figured, Michel's clips are described, one or two changes are made in the intestinal and tendon sutures described, and a description of Cathcart's method of suprapubic drainage is added.

Part IV contains seven chapters on operative technique. The first chapter is an important one and has had some eighteen pages added to it dealing with the temperature of the operating room, the furniture required, movable and immovable, the lighting and disinfection of the operating room, and the personnel and duties of the operating room staff. The second chapter deals with the preparation of the patient and the arrangement of the operating area, the third with the operation wound, its closure, the arrest of hæmorrhage, and the technique of abdominal sections, added matter here being new methods of incising and closing the abdominal parietes. The fourth chapter gives the after-treatment of abdominal operations, and is short for so important a topic; the fifth deals with dressings, and strongly advises the routine use of gloves in changing dressings; the sixth treats of the necessary preparations when operating in private houses, and in the seventh, under the heading of asepsis in general practice, the author lays down rules for the aseptic administration of hypodermic injections, for aseptic exploratory punctures, and for aseptic catheterization. A new section dealing with the tapping of serous cavities has been added to this chapter. Professor Pearson prefers slow emptying of these cavities by means of a No. 2 drainage tube passed through a canula.

The whole book shows evidence of careful revision, and the additions invariably enhance the value of the text. Professor Pearson may be congratulated on having produced a work which covers ground very lightly broken as a rule in general text-books of surgery.

E. M. P.

PUBLIC HEALTH LABORATORY WORK. By H. R. Kenwood. Fifth Edition. 1911. H. K. Lewis. London: 1911. Pp. xiii + 446. Price 10s. 6d. net.

The fifth edition of Professor Kenwood's well-known "Handbook of Public Health Laboratory Work," besides maintaining the excellence of its predecessors, contains useful additional matter.

The additions the author has thought fit to embody in the work are calculated to considerably enhance its value, especially as the demand made upon the student of practical work of this nature is constantly increasing.

The practical details given in the introduction are sound and very necessary to a proper appreciation of the methods of analysis given later. We would like to see these even further extended in a future edition. One has to remember that a large majority of those studying for an examination in public health have little technical knowledge of the methods of analysis, or have probably forgotten much that they knew, so that an introduction of this kind serves well to refresh the memory and give accuracy and value to the results.

The inclusion in this edition of a brief description of the spectroscope and polariscope, which enter so largely into the analysis of foods, is of value, although practical details for working are not given. These, however, would add considerably to the size of a work of this nature, and when required can be supplied from the many excellent text-books dealing with the subject.

Part I is devoted to a very full and lucid account of the chemical, microscopical, and physical examination of water, and taken in conjunction with the very careful description of the bacteriological examination, contributed by Dr. W. G. Savage in Part VII, should well satisfy the requirements of the medical officers of health and others. The methods given are those generally accepted as reliable, they are fully explained and accompanied by examples which are always so useful in making the way clear. The chapter on Wanklyn's process is especially to be commended, as it contains, besides much practical information, explanation of difficulties which are apt to occur and confuse the worker. An opinion on a water sample has always to be given with considerable care and reservation, but the author, from his own great experience, has written so concise an account of this that many of the difficulties will be smoothed away, if only his advice be carefully followed.

The section on alkalimetry and acidimetry is all too short. A more extended description of some of the indicators, including the compatibility with CO_2 and organic acids, &c., would have been of considerable service. The actual preparation of a standard solution is rather left to the imagination of the student, and the inclusion of the method of standardizing the normal HCl by means of a given quantity of pure sodium carbonate, for instance, would probably have made the subject clearer, for in our experience, although simple to ordinary workers in a laboratory, it frequently seems to present considerable difficulty to some students. It is noticed that the examination scheme for the detection of gases is still retained in this edition. There may be much to commend this, but it is very questionable whether such a scheme has any real practical value; it is apt to raise a false conception in the mind of the student. In the Royal Army Medical College and in other schools this analytical conjuring has for some time been discarded.

In the chapter on sewage a mistake in the Letts and Blake process has been corrected and Adney's method for the determination of the rate of absorption of dissolved oxygen in polluted water has been included. We entirely agree with the author that the standard laid down by the Royal Commission "that an effluent should not contain more than 3 parts of suspended matter in 100,000 parts" is exacting. The requirements laid down on page 146 are highly important and very sound.

The inclusion of a description of Haldane's apparatus for determining carbonic acid in air with details of working will be much appreciated, as at the present time there is probably no better method for hygienic purposes, owing chiefly to its great convenience, and, when once the manipulations are mastered, to the ease and expediency with which it may be worked.

Turning now to Part V, which is devoted to the examination of food, there is much that is practical, much that is interesting, and taken as a whole the subject has been treated with considerable skill and clearness, It is difficult in dealing with such a large subject to know exactly what should be included and what left out without detriment to a work of this kind, and the author is to be congratulated on the able way in which he has dealt with the matter, and on at the same time presenting a sound and very useful account of most, if not all, that is required.

The chapter on preserved and tinned provisions contains some valuable information, not often found in text-books, which is of importance not only to medical officers of health, but also to medical and supply officers of Government services.

The methods for detection of arsenic in foods are those generally given, but the inclusion of the distillation method of Schneider, as modified by Fischer and others, with the aid of ferrous chloride in the case of material containing organic matter, would be of service as a preliminary to the description of some of the recognized gravimetric methods.

Part VII, contributed by Dr. W. G. Savage, is well up to the standard of the other parts of the work, and beside describing bacteriological methods for the examination of foods, gives very clearly the method to be adopted in investigating outbreaks of food poisoning, which is undoubtedly a valuable guide.

Books of this nature are rather apt to be merely compilations of the subject, but the charm of this one lies not only in the presence of original work but also in that the working of all the methods given bears the imprint of being quite familiar to the author himself.

W. W. O. B.

A WOUNDED PRISONER OF WAR IN PARIS, 1870-71, UNDER THE PROTECTION OF THE RED CROSS. By Dr. Carl Beyer. Kohlhammer, Berlin, 1910. Pp. 272. 7¾ by 5 in., with three maps and two illustrations. Price 3s.

The author was a one-year volunteer soldier in the Queen Olga Grenadier Regiment in 1870, and took part in the Franco-Prussian War. During a sortie from Paris he was wounded in the foot, captured, and taken to a Red Cross hospital established in a deserted girls' school at St. Maur. Here he was well received and most kindly treated till liberated on the fall of Paris.

Beyer's experiences are full of interest and are graphically described. The long marches, the different billets and bivouacs during the early part of the campaign, the attitude of the inhabitants and the difficulty of purchasing extra food or luxuries afford an excellent picture of campaigning in Europe.

His notes on events in Paris during the siege give a good description of the feelings of the Parisians and of how, buoyed up by journalistic inventions, they hoped up to the last for assistance from outside. The municipal arrangements by which all food was seized and issued in steadily diminishing rations receive great praise, as it was only by this high-handed procedure that Paris was able to hold out for so long. The *garde mobile* of Paris appear to have done more damage to the inhabitants than the Prussians, in spite of the bombardment. "Ces bandits de moblots" were ready enough to swagger through the streets in uniform, to draw their pay or plunder deserted houses, but did not relish the idea of fighting at the outposts.

C. E. P.

LANDMARKS AND SURFACE MARKINGS OF THE HUMAN BODY. By L. Bathe Rawling, M.B., F.R.C.S. London: H. K. Lewis, 1911. Pp. viii. and 96. Price 5s. net.

This little book of 100 pages is so well known to the student that a description of its contents seems almost superfluous. All the important organs, nerves, and vessels are concisely localized and their superficial relations indicated in thirty excellent photographs. Their description is briefly and accurately given in numbered paragraphs.

An appendix, including the weights and dimensions of organs and the dates for the ossification of bones, completes the usefulness of this book as a "potted" anatomy. It should prove of invaluable assistance to those undertaking the strain of a promotion examination.

J. W. H. H.

Current Literature.

Leucocytes in Malaria, and a Method of Diagnosing Latent Malaria.—D. Thomson (*Annals of Tropical Medicine*, April 20, 1911) describes the results of his recent studies of the leucocytes in malarial fever. He finds that as a rule there is, during the paroxysm, a leukopenia affecting especially the mononuclears, and of these chiefly the large variety; during the intervals this is replaced by a leucocytosis affecting the same cells. So that during malaria the curve representing the percentage of mononuclear cells of all kinds is exactly the reverse of the temperature curve. During the intervals between attacks of fever the percentage of mononuclear cells remains high and a relapse is foreshadowed by a drop in their numbers. During latent malaria there are similar variations in the leucocytes, but these affect chiefly the polymorphonuclears, the variations follow the same periodicity as the original fever; they start as a rule about seven to ten days after clinical recovery, they are very transitory and easily missed unless frequent records are made, *e.g.*, in one case the author found a leucocytosis of 125,000, two hours later the count was 6,000. Applying these findings to the diagnosis of latent or uncured malaria the author recommends that one should take blood-smears every four to six hours during two or three days, and from them estimate the percentage of mononuclear cells (without attempting to differentiate between the various kinds). Variations in the percentage exceeding 20 per cent (and they may go up to 80 per cent) the author considers to be diagnostic of malaria, especially if the higher limits of the mononuclear percentage exceed 45 per cent. The character of the chart showing the results of the blood counts also indicates the type of fever, quotidian, tertian or irregular, which has preceded the latent period. These periodic variations appear to go on for months or even three or four years after apparent recovery.

W. S. H.

Crescents in Malignant Tertian Fever.—D. Thomson (*Annals of Tropical Medicine and Parasitology*, April 20, 1911, p. 57) gives the results of recent studies of crescents by enumerative methods. He finds that crescents appear in the peripheral blood full grown, having developed in the deeper vessels, and the date of their first appearance is ten days after the first appearance of asexual forms in the peripheral blood; these may, of course, precede the onset of fever, since there may be from 2,000 to 10,000 asexual forms per cubic millimetre of blood without fever resulting. The formation of crescents appears to be due to the production of partial immunity, since it is most marked in mild cases, in those of long standing, and in those with a history of previous attacks of malaria. Crescent production is also greater in older subjects, and in those whose hæmoglobin is least reduced; there is also some evidence that it is greater in those with palpably enlarged spleens. The effect of quinine on the production of crescents varies with the dose given; 10 gr. thrice daily is necessary to prevent the formation of crescents from the brood present during its administration, but it has no effect on crescent production if given two or three days after the paroxysm. Apparently once an asexual form has taken on sexual characters quinine has no influence whatever in preventing its development into a full-grown gamete. Given in smaller doses, say 5 grains daily, or irregularly, quinine appears to favour crescent production, possibly by helping the host to produce a certain amount of immunity without definitely killing off all the asexual forms. The writer states that quinine given in doses of 20 to 30 grains daily has never failed to reduce the crescents to below 1 per cubic millimetre within three weeks; this reduction is due not to the action of quinine on the crescents, for of that there appears to be none, but to the fact that the originating spores are destroyed and the crescents themselves when fully developed have only a comparatively short life (three to four days) in the peripheral circulation. Methylene blue in doses of 12 grains daily seem to have even more influence than quinine in preventing crescent formation, though it has little effect in preventing fever. In cases where quinine has not been taken, or has been taken irregularly, crescents appear in the peripheral blood, coming in floods corresponding to the periodicity of their originating asexual forms. If then quinine is given in adequate doses its effect on the crescents will not begin to be noticed till ten days after commencing the treatment, since up to that time the crescents which are appearing have originated from asexual forms which were present before the giving of quinine was started.

W. S. H.

The Fleas common on Rats in different parts of the world and the readiness with which they bite Man.—Chick and Martin (*Journal of Hygiene*, vol. xi, March, 1911).

SUMMARY.

"(1) *As far as is at present known*, the great majority of the fleas infesting *Mus rattus* and *Mus decumanus* in different parts of the world, belong to either the species *Xenopsylla cheopis*, *Ceratophyllus fasciatus*, *Ceratophyllus anisus*, *Ctenopsylla musculi* or *Ctenophthalmus agyrtes* or are comprised of some admixture of these five species.

"(2) *Xenopsylla cheopis* is the most prevalent in the tropics and sub-tropical regions and often occurs there to the almost complete exclusion of other species. It is common during summer and autumn in some of the warmer parts of the temperate zone, more especially in ports which have maritime intercourse with the tropics.

"(3) In the cooler regions *Ceratophyllus fasciatus* is the most universally distributed flea and is associated with more or less of *Ctenopsylla musculi* and *Ctenophthalmus agyrtes* according to the locality and the habitat of the particular rats.

"(4) In Japan *Ceratophyllus fasciatus* is replaced by *Ceratophyllus anisus*, a closely allied species.

"(5) The numerous other fleas which have been captured off rats are only occasional visitors.

"(6) *Ceratophyllus fasciatus*, like *Xenopsylla cheopis*, readily bites man. Out of 517 experiments, 308 fed, or 59 per cent were positive. In 101 experiments, under identical circumstances with a rat, 59, or 58·4 per cent of the fleas fed.

"(7) The experiments with *Ceratophyllus fasciatus* were made upon eight persons and evidence was obtained of preference on the part of the insects for particular individuals.

"(8) One hundred and eleven experiments were made with 46 specimens of *Ctenopsylla musculi*, only 4 fed = 3·6 per cent, whereas 9 out of 11 fed on a mouse.

"(9) Sixty-eight specimens of *Ctenophthalmus agyrtes* were tried, in some cases upon three persons. None fed, whereas 11 out of 19 of the same fleas fed on a rat under identical conditions.

"GENERAL CONCLUSIONS.

"*Xenopsylla cheopis* and *Ceratophyllus fasciatus* are the species of rat fleas which, when hungry, readily bite man. There is no reason to suppose that, other things being equal, *Ceratophyllus fasciatus* would not be as efficient an agent in the transmission of plague from rat to man as *Xenopsylla cheopis* has been shown to be in India."

Bacterial Variation.—Penfold (*Journal of Hygiene*, vol. xi, March, 1911).

SUMMARY OF RESULTS.

"(1) *Bacillus typhosus* ferments *dulcite*-peptone water in about ten days. By sub-culture this is readily shortened to one day. It produces non-fermenting colonies on dulcite-agar plates. The colonies show after five days and upwards, secondary colonies as papillæ, which may or may not have an acid reaction.

"Growth of *B. typhosus* on dulcite media readily gives rise to bacilli forming from the commencement acid colonies on dulcite plates. The dulcite character has a tendency to atavism in the early stage, which further growth on dulcite removes.

"(2) *B typhosus* can be trained to ferment lactose, only with very great difficulty. Definite and conclusive results have been obtained by me only with the white atavists of Twort's trained lactose strain. Other strains (twenty) have not yielded to such training methods, although many of them have been trained for over a year. The lactose character when acquired is very unstable, and is soon lost when growth takes place in a lactose-free medium. A fermenting colony on replating gives rise to a mixture of fermenting and non-fermenting colonies.

"(3) All strains of *B. typhosus* which I have examined show the secondary colonies on isodulcite described by Reiner Muller. Growth on isodulcite yields directly a strain without this papillæ-forming power. So-called "acid" papillæ, as described by Reiner Müller, have not been observed in the strains (twenty) investigated by me. This new strain does not regain the power to form isodulcite papillæ by frequent subculture apart from isodulcite. Apparently the acquired character has arisen by mutation. Fermentation of isodulcite requires a considerably longer process of training.

"(4) The above three characters vary in permanency. The permanency varies inversely as the time required for the selection or training.

"(5) Papillæ formation arising on carbohydrate media, on colonies of members of the typhoid-coli group, may indicate variation by slow degrees just as well as by mutation. I have observed it in normal typhoid, varying towards dulcite and lactose, as well as isodulcite. In the case of Twort's strain, which fermented sorbite slowly, I observed papillæ formation on sorbite-agar.

"Formation of papillæ simply indicates apparently that the variation only affects very few individuals of the colony to a great extent, and does not guarantee permanency in the character.

"If the papillæ arise early and without subculture, the evidence adduced so far suggests that the character will have considerable permanency. In the case of dulcite, the results show that the formation of papillæ on certain carbohydrate media cannot, as Reiner Muller stated, be regarded as definitely specific for the variety of micro-organism exhibiting them.

"The variations detailed in the above communication do not, in our view, invalidate the sugar tests as aids to differentiation, since these chemical functions are subject to variation probably to no greater extent than other functions of bacteria. Further, the ability of an organism to vary in any particular direction may be of considerable value in differential diagnosis.

"This instability makes it imperative to have as large a number of differentiating characters as possible for every species, and also to take care in laboratory culture that we do not grow bacteria under conditions likely to alter their characters. It would be inadvisable, for example, to propagate the *B. typhosus* from a dulcite culture a few days old if one desired it to conform to the normal typhoid type in respect of dulcite.

Bacillus paratyphosus Group.—Bainbridge and O'Brien (*Journal of Hygiene*, vol. xi, March, 1911).

SUMMARY AND CONCLUSIONS.

"(1) The term 'paratyphoid group of bacilli' has been confined in the present inquiry to those strains which in their cultural characters and agglutination reactions are indistinguishable from *Bacillus suipestifer* and *B. paratyphosus* B. *B. enteritidis* (Gaertner) and *B. paratyphosus* A are excluded.

"(2) The strains of bacilli belonging to the 'paratyphoid' group can be separated into two classes by means of the absorption method, namely, one group identical with recognized standard strains of *B. suipestifer*, and one identical with standard strains of *B. paratyphosus* B; and we regard these two bacilli as separate organisms.

"(3) In our experience, *B. suipestifer* has been found only in food or in outbreaks of acute illness attributable to food-poisoning, whereas *B. paratyphosus* B has been found in cases of paratyphoid fever or in persistent paratyphoid 'carriers.'

"(4) We are disposed to put forward the suggestion indicated by these observations, that these two organisms have a different distribution in nature, the normal habitat of *B. suipestifer* being the alimentary canal of the pig (and other animals) and of food derived from such animals, whereas the normal habitat of *B. paratyphosus* B is the human alimentary tract (including the gall-bladder).

"(5) The examination of the cultures from the fæces and urine of 300 typhoid convalescents was completely negative, neither *B. suipestifer* nor *B. paratyphosus* B being obtained. These observations confirm those of other writers, and, apart from carrier cases, the occurrence of *B. paratyphosus* B in healthy human beings appears to be unknown in this country."

Report on the Health of the Russian Army in the year 1908. (Published by the Headquarters Office of the Medical Service as a Supplement to the *Army Medical Journal.* Printed (1910) by the Military Press in St. Petersburg).—This is a long and very complete report with detailed information presented largely in the form of statistics, which are carefully worked out and which illustrate various aspects of the subject matter.

The number of medical officers actively serving on January 1st, 1908, was 3,191; of pharmacists, 241; of medical and dispensary feldshers, 4,828; of company battery or squadron feldshers, 4,461. On January 1st, 1909, the medical officers numbered 3,269; pharmacists, 242; medical and dispensary feldshers, 4,810; company (&c.) feldshers, 4,442. All the classes above mentioned were on the latter date under establishment by the following numbers: shortage of medical officers, 679; of pharmacists, 9; of medical and dispensary feldshers, 1,159; of company (&c.) feldshers, 983.

The proportions of the above-mentioned classes of the medical service to the general strength of the Army were as follows: one medical officer to 391 men; one pharmacist to 5,285 men; one feldsher to 138 men.

The yearly sick-rate, invaliding-rate, and death-rate for two successive years are shown in the following table:—

	Per 1,000 men of strength of army		
	Sick	Invalided	Died of disease
1907	436·5	43·9	3·52
1908	441·6	40·5	3·30

The average strength of the troops actively serving was 50,387 of officer's rank, and 1,279,051 of lower ranks.

Among officers there were 24,204 admissions to the sick list, and 346 deaths from disease. So that both the sick-rate and death-rate were higher among officers than among other classes.

In addition to the above-mentioned figures, 37 officers died from "misadventure" and 105 committed suicide.

Among lower ranks there were 564,837 admissions to hospitals of all kinds (including lazarets, receiving rooms, and sanitary stations): 4,942 died—4,226 from disease, 474 from "misadventure," and 242 by suicide; 51,846 were invalided. In addition, 4,457,776 cases received out-patient treatment, entailing 8,999,512 attendances. The average daily number of sick of lower ranks was 37,032·92. The average daily number of men under medical charge was 34·5 per 1,000 of lower ranks. The average period of absence from duty on account of ill-health was 10·6 days for each man below officer's rank. The average duration of stay in hospital was 23·8 days per each man admitted.

The diseases which caused the largest numbers of admissions into hospital were: Intermittent fever (43,978), influenza (36,573), gonorrhœa (34,106), gastro-intestinal catarrh (31,905), acute bronchitis (28,183), diseases of middle ear (18,874), inflammations (other than acute bronchitis) of respiratory passages (17,316), itch (15,895), syphilis "*recidiva*" (14,948), diseases of mouth (12,319), ulcers (11,302), soft chancre (11,161), anæmia (10,220).

There were 3,380 cases of primary syphilis. Admissions for "condylomatous" (secondary) syphilis are shown under two sub-headings, "*recens*" (3,016), and "*recidiva*" (14,948). "Gummatous" syphilis caused 662 admissions.

Prominent among causes of death were enteric fever, tuberculosis of lungs, "croupous" pneumonia, and diseases of the middle ear. There were 5,163 cases of enteric fever with a death-rate of 15 per cent, 3,127 cases of tuberculosis of lungs, with a death-rate of 18·9 per cent, 6,608 cases of croupous pneumonia, with a death-rate of 6·9 per cent, and 18,874 cases of disease of middle ear, with a death rate of 1·2 per cent.

Prominent among causes of invaliding were, in order, inflammations of the respiratory passages (not including acute bronchitis), diseases of the middle ear, hernia, pleurisy, tuberculosis of lungs, anæmia, enteric fever, gastro-intestinal catarrh, tuberculosis "of other organs," endocarditis and disorders of the heart, hysteria and neurasthenia, trachoma. It is worth noting that "endocarditis and disorders of the heart" account for only 2·7 per cent of the total number of invalids; there were 4,515 admissions into hospital for diseases of the heart.

The sick-rate was highest in January; it fell till August, after which time it rose continuously up to the end of the year. The chart shows minor rises in May, July, and September.

The sick rate, the invaliding rate, and the death rate were all highest among men in the first year of service, and are shown in a table as progressively and notably lessening during the second, third, and fourth years of service.

The infantry had a lower sick rate than that of the artillery and higher than that of the cavalry. In all three arms, guard troops are shown as having a much higher sick-rate than that of other troops, in spite of the superior physique of the former. The healthiest troops appear to have been the Cossack cavalry, and then, in order, the "Grenadier" artillery, the Grenadier regiments, and the infantry of the line.

Among the notes regarding the incidence, treatment, &c., of individual forms of disease, there is an interesting account of the treatment of cholera in the Semenof-Aleksandrof Military Hospital. The especially good results of warm and hot baths, with a kind of massage by means of brushes, are mentioned. The temperature of the bath was at first not higher than 30° Reaumur, raised later to 32°, 34°, 35° R. A patient received not more than four baths in twenty-four hours.

The table, showing in detail the causes of death by misadventure, is in some respects of other than professional interest. Officers killed are shown as two by malice, five by careless shooting, three in fights and quarrels, two by lower ranks, two by officers, two by police, one by a a kinsman, one by the burst of a shell, one at musketry practice, one by lightning, one by charcoal fumes, one by a fall from horse, one by sunstroke, ten shot under unknown circumstances, three were drowned. In yet greater (though not always entirely illuminating) detail are given the causes of death by misadventure among lower ranks. The methods of suicide are recorded, as also the causes in cases in which the cause has been officially determined. To an Englishman it is strange to find a record in an Army Medical Annual Report of such cases as "squandering of public funds and dismissal from service," "having killed his betrothed for fickleness," "hopeless love," "having killed an officer," "having been insulted by a comrade" for suicides of officers. But these are merely instances of the extraordinary completeness of the Report, and may also be regarded as evidences of a certain frankness which is a marked Russian characteristic.

G. S. McL.

Instructions for the Preparation and Management of Red Cross Society's Hospitals, Private Nursing and Convalescent Homes (Anhalt für die Einrichtung und den Betrieb von Vereinslazaretten, Privatpflegestätten und Genesungsheimen vom Roten Kreuz), by Generalarzt Dr. Grossheim, pp. 135, 8vo, Berlin, 1909, Central Committee of the Prussian Red Cross Society, price 1s. 6d. This little work has been published with the object of showing the various branches of the Red Cross Society exactly what is required in a hospital for sick and wounded soldiers, and how to set about opening and equipping it.

The opening paragraphs deal with the position of a voluntary aid hospital in relation to the military authorities, the necessity for preparations being made in peace time, and the army regulations which have to be observed. The next portion describes minutely the equipment and interior economy of a hospital; the following portions give similar particulars for private nursing and convalescent homes.

Of the twenty-five appendices the first gives a complete scheme of duties in connection with the opening and working of a hospital, showing who is responsible for each particular duty and how it is to be carried out. The second describes how a "docker" hut is set up. The remainder contain specimens of various forms which must be used in hospitals in which disabled soldiers are being treated, forms of contract for purveyors, scales of equipment, reports, &c., with brief notes as to when and how these are to be employed.

C. E. P.

Rubner's Disinfection Apparatus.—Lecture by Ober Ingenieur Vassel to the "Gesellschaft fur Offentliche Gesundsheitspflege," Berlin, Das Rote Kreuz, May 29th, 1910. In this apparatus disinfection is carried out by exposing articles to a mixture of steam and formaldehyde vapour at a temperature not exceeding 60° C., thus avoiding any damage to leather, fur, or articles put together with the aid of glue.

The apparatus consists of a closed iron chamber, connected to this is an exhaust air-pump and a generator containing an 8 per cent watery solution of formalin.

The articles to be disinfected are placed in the chamber, which is then closed, and the exhaust pump started till the internal pressure falls to 160 mm. of mercury. The formalin vapour generator which communicates with the top of the interior of the chamber contains a spiral tube, through which steam is now passed, and the formalin solution begins to vaporize in the form of steam containing 3 per cent of formaldehyde gas; being lighter than air the steam and formalin displaces the remaining air downwards, and the air pump draws it off. When the chamber is completely filled with the formalin steam, the thermometer placed at the exhaust outlet suddenly rises to 60° C. The air pump must be kept at work, as if not the pressure, and with it the temperature, will rise. The articles should be left for one hour, by which time everything, even tightly tied up bundles of blankets or closed travelling bags, will be thoroughly disinfected. The whole of the formalin used is collected in a cooling chamber, placed between the disinfector and the air pump, and can be used over and over again.*

To show that the displacement of the air by the steam is mainly due to the greater specific gravity of the air, and not to the suction of the air pump, a top boot, with a test culture placed in its toe, was suspended in the disinfecting chamber with the leg of the boot pointing *upwards*; the results were variable, and one could not rely on complete sterilization of the test culture unless holes were first bored through the sole of the boot to permit of the displacement of the heavy air by the lighter steam.

In the event of a supply of formalin being unobtainable, the apparatus can be used as an ordinary current steam disinfector.

C. E. P.

A Bacteriological Study of Ham Souring.—C. N. McBryde, M.D., United States Department of Agriculture, Bureau of Animal Industry, Bulletin 132, March 17, 1911. It appears that the souring of hams is a matter of considerable importance to those engaged in the meat-packing industry, and that the loss due to this cause alone is considerable.

The investigation reported in this bulletin is on bacteriological lines, confined entirely to the wet method of curing hams, as this is the one usually carried out in America.

The souring of hams implies that the ham is tainted and gives off any odour which deviates from the normal, but when pronounced is distinctly putrefactive in quality.

In this paper it is shown that ham souring is due to the growth of an anaerobic bacillus, to which the author has given the name of *Bacillus putrificans*. This must not, however, be confounded with the *B. putrificus* of Bienstock, also a cause of putrefaction in meat, the cultural reactions of which differ considerably.

The organisms gain entrance to the hams by means of the thermometers used in testing, on the pumping needles, or may be carried into the hams in the pumping pickle itself, or from the curing pickle.

The bacillus develops in the deeper portions of the hams near the bone and causes chemical changes in the tissues, with the result that hams once infected can never be restored to a sound condition. The organism is a large bacillus which is widely distributed in dust, soil and excrementitious matters. It develops in long irregular chains, which at times show a slightly spiral form. It is non-motile and stains by the ordinary aniline dyes and by Gram's method. The spores are terminal and develop rapidly in egg-pork medium at 20° to 25° C. The bacillus is killed at 55° C. in ten minutes, but the spores survive a temperature of 80° C. for twenty minutes, but are killed at 100° C. in ten minutes.

The organism forms gas in glucose, but not in lactose or saccharose, and the gas formula is $\frac{H}{CO_2} = \frac{\cdot 5}{1}$.

The prevention, according to the author, is to be sought in two ways: (1) Through greater care in handling the hams, and the adoption of precautionary measures to prevent the introduction of the ham-souring bacillus into the bodies of hams, and (2) through more thorough pumping of the deeper or inner portions of the hams, so as to create an unfavourable soil or medium in which the ham-souring bacillus cannot develop, even if it should gain entrance into the bodies of the hams.

W. W. O. B.

Tropical Bronchomycosis.—(Castellani, *Extract from the Report of the Advisory Committee for the Tropical Diseases Research Fund, for the year* 1910). "During the six years of my residence in Ceylon, I have often been struck by the comparatively large number of cases of subchronic and chronic bronchitis, which on preliminary clinical examination one would suspect to be of tubercular nature, while complete investigation shows constant absence of tubercle bacilli in the sputum, the ophthalmic and cuti reactions negative, and inoculation of the sputum into susceptible animals also negative. Some of these cases turned out to be 'bronchospirochætosis,' the condition described by me in 1905. In other cases, however, neither spirochætes nor tubercle bacilli are found, and in a certain number of these cases fungi higher than bacteria are present. These are cases of bronchomycosis. Of this affection in Ceylon I have come across at least twenty cases, basing the diagnosis on the result of the examination of the sputum, and have culturally studied the fungi in four. In Ceylon a mild and a severe type may be distinguished. In the mild type the patient complains of cough with muco-purulent expectoration. There is no fever, the general condition is fairly good; the physical examination of the chest will show nothing at all or a few moist and dry *râles*. In the severe type the disease closely resembles phthisis. The patient becomes emaciated, there is hectic fever, muco-purulent and bloody expectoration, the physical examination of the chest reveals patches of dullness, fine crepitation and pleural rubbing."

The following is one of the cases quoted:—

"Mild type, Case 1.—Mr. B., a young tea-taster, has been in Ceylon eight years; never had any disease worth noting. He stays several hours daily in rooms full of tea-dust and fluff, and says that he often snuffs various teas, putting a pinch of the tea in his nostrils. Since six months complains of cough, with a certain amount of muco-purulent expectoration. No fever; the examination of the chest reveals nothing. Microscopical examination of the sputum for tubercle bacilli negative. In fresh preparations a few branching mycelial tubes are visible; rare free spores.

"*Treatment.*—Ordinary cough mixtures useless; potass. iodid. in large doses cured the condition in four weeks."

SPECIAL EXAMINATIONS.

"*Sputum.*—Examination for tubercle bacilli repeated several times negative. The microscopical examination of the fresh preparations shows a large amount of a fungus, numerous spores and some mycelium being present. The fungus (see table, Strain VI) is easily grown, using maltose and other sugar agars. A few cocci and short bacilli are present; true pneumococci apparently absent.

"*Blood.*—Widal and bile blood cultures negative; sporo-agglutination for the fungus positive.

"*Course.*—The temperature gradually decreased to normal. There were no sweatings or shivering fits. The condition of the respiratory organs gradually improved the patches of diminished resonance becoming normal. The expectoration, which had never been very abundant, decreased rapidly, and the fungus disappeared.

"*The Fungus.*—In fresh preparations of the sputum, spore-like, round or oval cells, 4—6 μ, are seen, and portions of mycelial tubes. The fungus is gram-positive. If a particle of the sputum be smeared on maltose or glucose agar plates, after two or three days, numerous white, roundish colonies appear, easily distinguished, even macroscopically, with a little practice, from the colonies of cocci, &c. The fungus colonies are further investigated by inoculating various sugar agars and sugar broths. On solid media the six strains I have isolated are identical; their growth is comparatively scarce on ordinary alkaline agar, while it is very abundant, thick and of white creamy colour in the various acid sugar agars.

The best media are, perhaps, Sabouraud and glucose agars. On these media the growth on the slope consists principally of globular cells similar to a yeast, while in the water of condensation globular cells and mycelial articles are generally present together. A little mycelium may, however, occasionally be found also in the growth on the slope."

CONCLUSIONS.

"(1) A type of bronchitis in which an oidium is present in the expectoration is of common occurrence in Ceylon.

"(2) The fungus is probably the true cause of the disease, as in my cases no other etiological agent, such as tubercular bacilli, &c., could be found. Moreover, when the patient gets better the fungus becomes very scarce or disappears completely.

"(3) The oidium infection apparently attacks directly the bronchi, as none of my patients presented lesions due to oidia in the mouth or pharynx.

"(4) The oidium, as shown by its culture characters, seems to be a new species, for which I suggested the term *Oidium tropicale.* The pathological condition caused by it might be called 'tropical broncho-oidiosis.' In my previous report I classified the strains isolated into two groups, those producing gas in galactose and those not producing gas in that medium. Further investigation has shown that under certain circumstances all strains may produce a little gas in galactose, and therefore this distinction into two groups is not correct.

"(5) The diagnosis of tropical broncho-oidiosis is based on bacteriological methods The condition is distinguished from pulmonary tuberculosis by the absence of the tubercle bacillus, the negative animal inoculations, and the negative result of the cuti—and ocular—reactions; from 'broncho-spirochætosis' by the absence of spirochætes; from endemic hæmophthisis by the absence of ova of the specific worm (*Paragonimus westermani*, Kerbert).

"(6) Before making a diagnosis of 'broncho-oidiosis,' care should be taken to ascertain that the expectoration was collected in sterile Petri dishes, because in a tropical country sputum exposed to the air quickly becomes contaminated with various fungi. Primary broncho-oidiosis should also be distinguished from the secondary broncho-oidiosis occasionally met with in cachectic patients suffering from cancer, diabetes, tuberculosis, &c., and presenting thrush lesions on the oral mucosa. In these cases the ordinary thrush fungus (*Oidium albicans*) may occasionally spread from the oral mucosa to the respiratory organs."

The Tactical and Clinical Course of Instruction for Medical Officers of the Swiss Army (Oberstabsarzt Steiner, *Streff. Milit. Zeitschr.*, ii, 1910, p 1929).—By the kindness of the Swiss Military Authorities, Steiner received permission to attend this course, which was held from September 12th to October 2nd, 1909, at Geneva. This course is for senior lieutenants, and must be taken before promotion to captain. The course embraces instruction in military medical subjects, tactics and riding, together with a post-graduate course on professional subjects.

(1) *Army Medical Work.*—This portion of the course was mainly devoted to the new Swiss army medical regulations. The Army Medical Service consists of medical officers, pharmacists, non-commissioned

officers and men. It is organized in "lazarettes" (field hospitals), each of which has three to four sub-divisions called ambulances. The transport personnel is found by the medical "train" company.

There are also Sanitäts-kolonnen, specially organized and trained for the transport of sick by road or rail.

Men of the medical corps undergo sixty days' instruction in bearer work at the recruits' school. A certain number of men then receive twenty-eight days' instruction in the care of wounded in a hospital. In each of the following years of liability for service a revision course lasting eleven days has to be attended.

Men who hope to become officers in the Army Medical Service must, while medical students, attend the recruits' and N.C.O's. schools of instruction. On receiving the diploma of Doctors of Medicine, they have to attend a forty-five days' course at the officers' school of instruction On completing this course they are appointed Lieutenants in the Army Medical Service. They have to serve for at least two years as Lieutenants, and during this time must attend one course at the recruits' school of instruction, and take part in manœuvres on two occasions. They are then appointed First Lieutenants. Before being promoted to Captain, in addition to a revision course yearly, they have to attend the tactical clinical course, described in this article. Those who desire to be promoted to Major must attend a fifty days' course at the central school of instruction, along with captains of all branches of the Army. Promotion beyond the rank of Major depends on the reports of their capability while holding various appointments, *e.g.*, instructor at the recruits' school, senior medical officer of a brigade, &c.

During this course special attention was directed to the new organization of the Army Medical Service in mountain warfare. In future, each company of the troops told off specially for mountain work will have one medical officer, one N.C.O. of the medical corps, two nursing orderlies, five stretcher bearers, and one pack animal for medical requisites. Special mountain field hospitals are also being organized with the following personnel: Ten medical officers, two pharmacists, one quartermaster, one train officer and 132 bearers, total personnel of all kinds 225. One such field hospital will be allotted to each mountain brigade having a strength of about 6,500 men.

(2) *Tactics.*—This subject began with a general review of the Swiss Army organization, with special reference to the recent conversion of the four army corps into six independent divisions. The official manual "An Introduction to Tactics for Medical Officers" was used as the text-book. The instruction was given by an army medical officer.

(3) *Map Reading and Sketching.*—The instruction included lectures and practical work in the country.

(4) *The Medical Service on the Lines of Communication.*—Special stress was laid on the use of railways for the evacuation of sick and wounded. Personnel for this service is found by the "Landsturm." In war the Lines of Communication are placed under the control of an "etappen Direktor," an officer of the general staff, assisted by a director of railways, a chief engineer, a deputy director of medical services, a veterinary officer, a war commissary, a deputy inspector-general, and a director of telegraphs. The deputy director of medical services is in direct communication with the director of medical services of the army

at the front, and the director-general of the Army Medical Service in the home territory. The medical units on the Lines of Communication are: (1) Three ambulance trains capable of carrying 140 to 200 lying-down cases; (2) five sick convoy detachments, each having thirty vehicles for the conveyance of wounded by road; (3) five field ambulances furnished by the "Landwehr"; (4) refreshment stations; (5) stationary hospitals equipped by voluntary aid societies. Arrangements are also made to equip improvised ambulance trains, and ambulance steamers on the lakes to supplement the regular ambulance trains.

(5) *Medical Examination of Recruits.*—General instruction was given on the subject of determining the fitness for service of recruits. It may be of interest to note that in 1907 only seventy-nine men appealed against the decision of fitness, but 193 did so because they had been found unfit.

Steiner then gives a description of the "commissions," by which men are called up for service and examined as to fitness. The examination includes simple tests of education and gymnastics. Considerable rivalry is shown by the various cantonments on the question of gymnastics, each striving to obtain the highest percentage of qualified recruits.

(6) *Military Insurance Department.*—The Swiss Government insures all men against accident or sickness arising out of their training. A special department deals with this subject. The scheme of insurance also embraces civilian employees and workmen belonging to the military department, members of rifle clubs, persons employed in the preliminary military instruction of youths, and in war time members of voluntary aid societies.

The compensation given varies with the nature of the injury or disease. In some cases free treatment is allowed in a military hospital, or at the man's home for temporary incapacity, together with his pay for the remainder of his period of service, and afterwards a daily allowance, up to 70 per cent of the man's earnings. In the case of permanent incapacity the man receives a pension, which, in the event of his death, may be continued to his dependents.

(7) *Military Surgery.*—The instruction was mainly on the effect of wounds. A demonstration was also given by firing at corpses at various ranges, and then dissecting the damaged tissues to show the actual results.

(8) *Military Hygiene.*—A series of lectures were delivered on this subject.

(9) *Pistol Practice.*—Swiss army medical officers are armed with automatic pistols of 7·65 mm. bore, firing a bullet weighing 6 grammes, with an extreme range of 1,800 metres. Each officer had to fire a course with this weapon.

(10) *Riding School.*—Each officer had to attend the course of equitation. Each officer is obliged to maintain a horse, most of them belong to riding clubs to which Government horses are lent.

(11) The course terminated with a six days' staff ride, the scheme of which is given.

C. E .P.

Army Statistics (Japanese).—(*Japanese Weekly Mail*, April 1st, 1911, p. 331). A pamphlet recently issued by the War Office contains interesting information on the results of last year's conscription of new recruits. According to the statistics given in the pamphlet, the total number of youths of conscript age last year aggregated 551,924, showing a decrease of 17,393, as compared with the preceding year. Of this number the postponement of enlistment was granted to 684 (showing an increase of 61 over the figure for the preceding year) for the reason of "difficulty in living"; to 83,602 (showing an increase of 1,208) in course of their studies in public and private schools; to 35,538 (showing an increase of 2,263) residing in foreign countries; to 26,678 (showing a decrease of 1,183) for the reason of disappearance, and in course of trial in criminal courts; to 696 (showing an increase of 262) for their serving terms of imprisonment, and to 8,383 (showing a decrease of 384) for sickness and some other reasons. Thus the conscripts who came up for physical examination, altogether numbered 436,343. Out of every 1,000 about 703 were passed as A and B classes of the physical standard, the rest being put to C or lower classes.

Out of 430,000 conscripts who came up for physical examination, 7,941 were found suffering from an eye disease (known as trachoma), while the patients with venereal disease numbered 11,593. With regard to height, those standing over 5 feet 3 inches numbered some 323 out of every 1,000, showing an increase of about 9, as compared with the figure for the preceding year. The educational qualifications of the conscripts have shown great development of late, but there were about 43 in every 1,000 who are ignorant of the three R's. The attempted evasion of conscript duties is most conspicuous amongst those who have received higher education. The non-attendants at the conscription examination with good reasons numbered about 2,000 last year, showing an increase of 416, as compared with the preceding year. Contrary to the above phenomenon, the number of those volunteering for enlistment showed a steady increase. These volunteers numbered 3,437 (of whom 2,227 were enlisted), showing an increase of 466 over the figure recorded for the preceding year.

Salvarsan and the Nervous System.—Professor E. Finger (*Berlin klin. Woch.*, No. 18, 1911) gives the detailed medical history of three patients suffering from syphilis in an early stage, each of whom received an intramuscular injection of 0·4 gramme of salvarsan, and which was in each case followed by an attack of optic neuritis.

The optic neuritis began about eight to nine weeks after the injection, and was accompanied by severe headache. In each case the patients were carefully examined and organic disease excluded, before being injected. In one case there was also some paresis of the oculo-motor muscles; the symptoms were in this case attributed to a focus of spirochætes, and a second injection of salvarsan was given; this did not effect any improvement in the patient's condition. In two of the cases the optic neuritis gradually cleared up, leaving in one case diminished acuity of vision; in the third case the optic neuritis is still present.

In all three cases the course of the affection was intermittent, temporary improvement being followed by a relapse. Finger thinks that this points to intermittent absorption of some poison, probably derived from the deposit of salvarsan in the necrosed muscle fibres. In one case arsenic was found in the urine nine months after the injection.

C. E. P.

Pergenol, a Solid Form of Peroxide of Hydrogen.—(Syring, *Deut. Militärarz. Zeitschr.*, April 20, 1911.) This preparation has lately been put on sale by a Berlin firm. It is a white crystalline powder, consisting of bi-borate of soda and bi-tartarate of soda. On dissolving it in water chemical action ensues and results in the formation of peroxide of hydrogen, boric acid and tartarate of soda; 100 parts of pergenol yield 12 of peroxide of hydrogen and 22 of boric acid. Pergenol is sold in metal tubes containing 50, 100, or 250 grammes of the powder, or in tabloid form, each tabloid containing 0·5 or 2·5 grammes.

Ten grammes of pergenol dissolved in 120 cc. of water makes 120 cc. of a 1 per cent. solution of peroxide of hydrogen.

C. E. P.

Beri-Beri and Paddy Bran.—(Med. Major Jajot, *Annales d'Hygiène Méd. Coloniales.*) This officer reviews the literature of this subject and then proceeds to describe his own experience in treating beri-beri in Annam. He does not agree with the majority of writers on the subject, and sums up his experiences as follows:—

The incidence of beri-beri at Cap Saint Jacques (the author's station) does not appear to be in any way connected with food.

Bran obtained from paddy has no influence at all on the course of beri-beri, it does not prevent relapses from occurring in cases which have apparently recovered, and it does not prevent the occurrence of beri-beri. These conclusions only apply to the author's experience under the conditions prevailing at Cap Saint Jacques, and merely refer to the action of bran obtained from the rice factories.

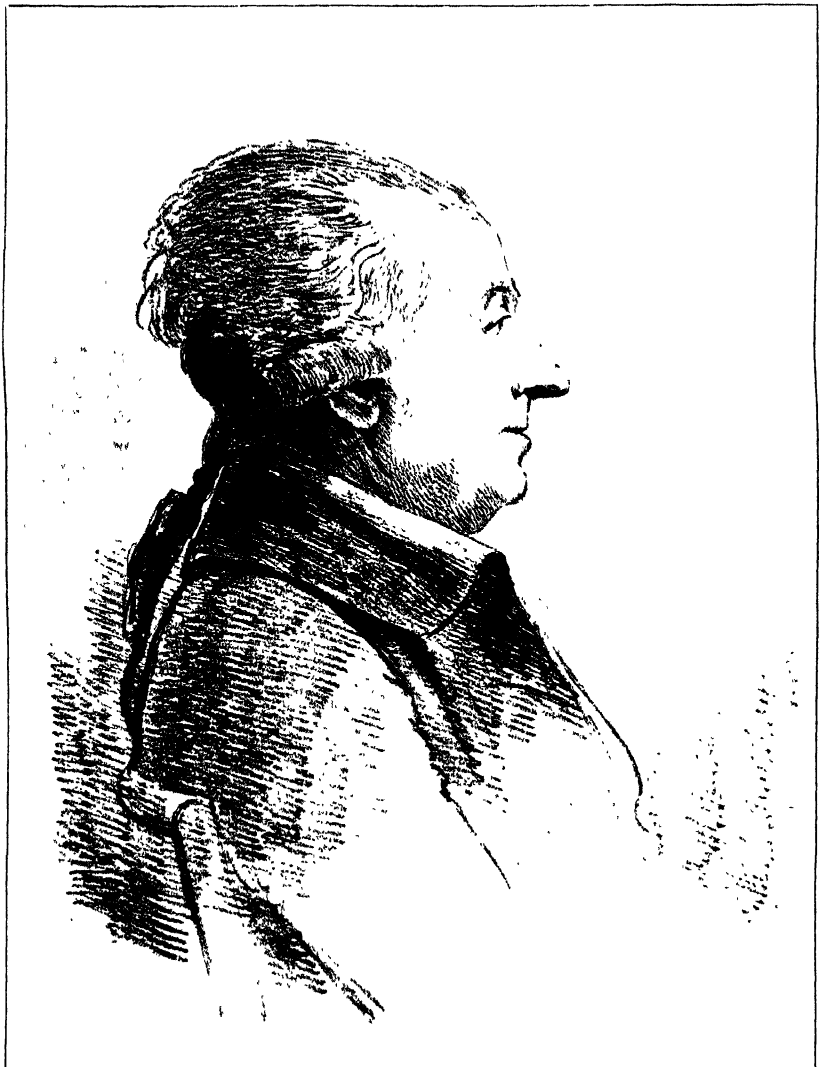
C. E. P.

Ambulance Dogs.—(*Le Caducée*, April 15th, 1911.) The Minister of War has decided to co-operate with the "Société nationale du chien sanitaire" in establishing a training kennel for ambulance dogs at Fontainebleau. The breed of dog selected is the French sheep dog; only four will be trained to begin with. These are to be tried on manœuvres under varying conditions. When sufficient experience has been gained to show which are the best methods of training and employing these dogs, it is intended to increase the establishment to enable it to furnish at least one trained dog for each bearer company.

C. E. P.

Conveyance of Wounded in Mountain Warfare by Means of Ski-Stretchers.—(Morisson, *Arch. Méd. Phar. Mil.*, January, 1911.) The writer describes a simple method of fixing a stretcher on skis. Four specially made blocks of wood are required; these must be carried with the party. Each block has a flange attachment on its under surface, which slips over the ski and is fixed in position by screws; the centre of each block is hollowed out to take one foot of the stretcher. When a man of the ski company is disabled, his skis are taken off, the blocks fixed on, and the stretcher fitted into them. Cords are fixed to the sides of the stretcher and it is towed by two men on skis. An improvised stretcher can also be transported in the same way.

C. E. P.



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RICHARD BROCKLESBY, M.D., F.R.C.P., F.R.S.,

PHYSICIAN TO THE FORCES AND AFTERWARDS PHYSICIAN-GENERAL TO THE ORDNANCE.

By MAJOR H. A. L. HOWELL.
Royal Army Medical Corps.

THE student of the early history of the Army Medical Service cannot fail to have noted that during the piping times of peace there is little record of medical officers of our Army outside the Army Lists, whereas a period of war of any long duration has always been followed by the recognition of eminent army physicians and surgeons who by their writings and practice have contributed very greatly to the progress of medicine and surgery. The "Hundred Years War," the Tudor wars, the Great Civil War, The "Seven Years War," and the Peninsular War were all followed in this way by the appearance of works on military medicine, surgery, and hygiene, many of the writers of which attained to great professional eminence after they had left the army and entered into the civil practice of their profession. To quote the names of Gale, Clowes, Woodal, Sydenham, Wiseman, Ranby, Donald Monro, Pringle, Brocklesby, Cleghorn, Home, Hunter, and Guthrie will be sufficient to prove this contention, although these names by no means exhaust the long list which a moment's thought brings to the mind.

It is with an army physician who, with Pringle, Monro, Cleghorn, and Home, took part in the great revival of, and progress in, military medical science which was associated with the wars of the middle period of the eighteenth century that this memoir deals.

Richard Brocklesby, the only son of Richard Brocklesby, Esq., of the City of Cork, by Mary Alloway, of Minehead, Somersetshire, was born at Minehead, where his mother was on a visit to her parents, on 11th August, 1722. Both families belonged to the Society of Friends. He remained at Minehead until he was three years of age, when he was taken to Ireland, and was for some years privately instructed in his father's house at Cork. Towards the end of March, 1734, he was sent to Ballytore School in Kildare, at which school Edmund Burke was also educated. Although contemporaries at school for less than a year, the circumstance led to a long and devoted friendship which lasted through life.

Brocklesby having finished his classical education at Ballytore, his father decided that he should become a physician, and, with this object in view, sent him to Edinburgh, where he commenced the study of medicine on 3rd March, 1742, and he was admitted a member of the Medical Society there. He did not stay long in Scotland, but continued his studies at Leyden, where "he was entered on the physic line" on 22nd November, 1743. Here he attended the lectures of Albinus, Gaubius, Oosterdijk, Schacht, and Van Royen, and graduated Doctor of Medicine on 28th June, 1745, his thesis being "De Saliva Sana et Morbosa." Brocklesby corresponded with his old teacher Gaubius for many years after he left Leyden. Soon after taking his degree he settled in London, and started practice in Broad Street. His father assisted him with £150 a year, a liberal allowance at that time, and diligence, integrity and economy soon enabled him to surmount the difficulties which a young physician beginning practice has to encounter. In 1746 he published "An Essay concerning the Mortality among Horned Cattle." In this he advocated the burial of the infected bodies of the animals in deep graves.

Brocklesby was admitted Licentiate of the Royal College of Physicians on 1st April, 1751. He had by this time become acquainted with the leading men of his profession, particularly the celebrated Dr. Mead, Dr. Leatherhead, Dr. Heberden, and Sir George Baker. Judicious flattery of Mead had helped him not a little and in later years he was fond of relating anecdotes of that extraordinary man. A favourite anecdote was his description of a dinner which Mead gave to the impostor Psalmanazar. Psalmanazar pretended to be a native of Formosa, and his fabulous account of that island and the customs of its people created a great sensation in England at that time. He had stated that the Formosans constantly fed on raw human flesh. Mead, to test the truth of this, had provided at the dinner a pound of flesh (from the gluteal region of a body in the dissecting room) as a dish for his guest. Psalmanazar did not flinch from the ordeal.

On 28th September, 1754, Brocklesby obtained the honorary degree of M.D. from the University of Dublin, and was admitted *ad eundem* at Cambridge on 16th December of the same year. In virtue of his Cambridge degree he was admitted a Candidate of the Royal College of Physicians, 25th June, 1755, and a Fellow on 25th June, 1756. He was Gulstonian Lecturer in 1758, Censor in 1758, 1763, and 1765; Harveian Orator in 1760, Croonian Lecturer in 1763, and was finally named an Elect in 1778, in place of Dr. James Hawley, deceased.

On 7th October, 1757, on the recommendation of Dr. Shaw, and through the patronage of Lord Barrington, Brocklesby was appointed a Physician to the Army. In this capacity he served for some time in Germany during the Seven Years' War, and distinguishing himself by his zeal, knowledge, and humanity, he attracted to himself the friendship of the Duke of Richmond, Lord Pembroke, and others. He returned to England some time before the peace of 1763, for a time was in charge of the Military Hospital at Pimlico, and was soon after placed on the half-pay list, on which he continued until his death.

On his return from the Continent, Brocklesby settled in Norfolk Street, Strand, where he was regarded as a physician of extensive experience, especially in all diseases incident to life in the Army. An estate of about £600 a year had come to him on the death of his father, and he had, in addition, his half-pay as an Army Physician. His practice increasing in proportion to his reputation, he was soon able to live in a very handsome manner, maintaining a good table, at which he entertained frequently the most distinguished persons of rank, learning, and ability of his day.

Brocklesby was a man of most generous spirit, his purse, as well as his medical advice, being always at the service of the poor. Many persons of merit, when in financial difficulties, were helped by him. To Dr. Johnson he offered £100 a year for life, and, upon Dr. Johnson declining it, he offered him apartments in his own house. Boswell tells us Johnson referred to this incident as "an instance of extraordinary liberality of friendship," and that "a grateful tear started in his eye as he spoke this in a faltering tone."

Another instance of Brocklesby's generosity and thoughtfulness is mentioned in Burke's Correspondence. On 2nd July, 1788, he wrote to Burke to make him "an instant present of £1,000, which," he continued, "for years past, by will, I had destined as a testimony of my regard on my decease." Burke, in accepting the gift, said, "I shall never be ashamed to have it known that I am obliged to one who never can be capable of converting his kindness into a burthen."

Brocklesby had always upon his list two or three poor widows, to whom he granted annuities. The ladies attended on quarter day to receive their stipends, were received by their host with the greatest courtesy, and partook of the hospitalities of his table. He was equally liberal to his poorer relatives.

Although an ardent Whig, Brocklesby's political opinions did not prevent him from being the sincere friend of many prominent Tories. His close friendship with that great Tory, Dr. Johnson, is an instance of this. Boswell's "Life of Johnson" contains many references to their intimacy. On Sunday, 31st March, 1783, Boswell found Johnson at home with Dr. Brocklesby, "whose reading, and knowledge of life, and good spirits, supply him with a never-failing source of conversation." Johnson founded an evening club in Essex Street, Strand, which, from the place of meeting was called the Essex Head Club. Brocklesby was a member. It met three times a week and absentees were fined threepence. The rules were drawn up by Johnson.

When Johnson lost his faculty of speech in June, 1783, he was attended by Brocklesby, who met Dr. Heberden in consultation on the case. In February, 1784, he again attended Johnson and consulted Cullen, Munro, and Sir Alexander Dick by letter through Boswell. In December of the same year, Brocklesby attended Johnson in his last illness until his death.

Hannah More says that Johnson was very anxious about Brocklesby's religious opinions, and, on one occasion, having put up a fervent prayer that Brocklesby might become a sincere Christian, "caught hold of his hand and cried, 'Doctor, you do not say *Amen.*' The doctor looked foolishly, but, after a pause, said '*Amen.*'" Dr. Johnson, in his will, left Brocklesby and some others "each a book at their election, to keep as a token of remembrance."

Reference has already been made to Brocklesby's ardent friendship for Edmund Burke. Burke's ingenious pun on Brocklesby's name is worth recalling. At that time there flourished a most blatant advertising quack, one Dr. Rock. Brocklesby must have been somewhat annoyed, therefore, when Burke accosted him as Dr. Rock. "Don't be offended. Your name is Rock," said Burke, with a laugh, "I'll prove it algebraically: *Brock* — *b* = *Rock*, or *Brock less b* makes Rock."

We have spoken of his friends, but Brocklesby also had at least one enemy, and their quarrel ended in an amusing duel. The other principal was Dr. (afterwards Sir John) Elliot. It is related that the combatants met on the field but never exchanged shots, because their seconds could not agree on the right number of paces at which to place their men.

On attaining the age of 73 Brocklesby was obliged, owing to the infirmities of old age, to give up a good deal of his practice, but continued his benevolent custom of gratuitously attending on the poor. On 13th of March, 1794, his old friend and patron the Duke of Richmond, then Master-General of Ordnance, appointed him Physician-General to the Ordnance. This appointment, which carried with it an allowance of twenty shillings a day, necessitated occasional visits to the Ordnance Hospital at Woolwich. The Professorship of Chemistry at the College at Woolwich was instituted at Brocklesby's suggestion.

"Though debilitated beyond his years, particularly for a man of his constant exercise and abstemious and regular manner of living, he kept up his acquaintances and friendships to the last, and in a degree partook of the pleasantries and convivialities of the table. The friends who knew his habits sometimes indulged him with a nap in his armchair after dinner, which greatly refreshed him; he would then turn to the company and pay his club of the conversation, either by anecdote or observation, entirely free from the laws and severities of old age." We gather that he was a clever conversationalist and very happy in his frequent quotations from Shakespeare.

In December, 1797, Brocklesby went on a visit to Mrs. Burke at Beaconsfield. On the 11th, remembering that his nephew, the celebrated Dr. Thomas Young, Foreign Secretary to the Royal Society, was coming from Cambridge to London next day, he returned to London. After dinner with his friends, at 9 p.m. he desired to go to bed, but was so fatigued that he was unable to mount the stairs and was obliged to sit in his chair until he felt stronger. In a little time he recovered, and, as he was being undressed, said to his elder nephew, "What an idle piece of ceremony this buttoning and unbuttoning is to me now!" He seemed perfectly composed when he got to bed, but about five minutes later he quietly expired. He was buried in the churchyard of St. Clement Danes, privately, on 18th December, 1797.

With the exception of a few legacies to his servants and distant relations, he left his fortune of £30,000 to his nephews. His Irish estates, which were considerable, were bequeathed to his nephew, Mr. Beeby, while the house and furniture in Norfolk Street, his library, prints, a choice collection of paintings (chiefly selected by his friend, Sir Joshua Reynolds), and about £10,000 in money were left to his other nephew, Dr. Thomas Young. Dr. Brocklesby's portrait was painted by Copley, and afterwards engraved by Ridley.

In addition to the published writings of Brocklesby already mentioned he published in 1760 his "Eulogium Medicum, sive Oratio Anniversaria Harveiana habita in Theatris Collegii Regalis Medicorum, Londinensium, Die xviii. Octobris, 1760." He also contributed papers to the Philosophical Transactions and to the Medical Observations and Inquiries. These included papers on "An Account of the Poisonous Root lately found mixed with Gentian," "Experiments on the Sensibility and Irritability of the several parts of Animals," "Case of a Lady labouring under a Diabetes," "Experiments relative to the Analysis and Virtues of Seltzer Water," and "Case of an Encysted Tumour in the Orbit of the Eye, cured by Messrs. Bromfield and Ingram." He also published, in 1749, "Reflections on Antient and Modern Musick." This was written early in life and refers to the use of music in calming the minds of sick people.

But Brocklesby's chief claim to remembrance as an Army medical officer is his great work entitled "Oeconomical and Medical Observations, in two parts, from 1758 to 1763, inclusive, tending to the improvement of Military Hospitals and to the care of camp diseases incident to soldiers," which was published in 1764. It has been described as "The first book in which sound principles of hygiene were laid down for the Army." It is an extremely interesting book and, in the experience of the writer, a rare one. The copy in the library of the Royal College of Physicians contains corrections and annotations in Brocklesby's handwriting.

A long and interesting article could be written on this book, but a few indications of its scope and teaching may be given here. He was anxious to improve the class of men who then entered the Army as surgeons, and suggested that the price of their commissions should be raised in value and fairly and openly sold for £600 to £700, and that, in addition, all candidates should undergo a strict examination as to their professional attainments. He pointed out the relative frequency of surgical and medical affections in a regiment, showing the proportion was something about one to twenty, and that, therefore, it was necessary that an Army medical officer should be a good physician, and considered further that the

College of Physicians should conduct the examination instead of "Surgeons' Hall," as was then the custom. He also insisted that the medical officer should be in absolute command of his hospital. Although a few barracks existed in England—they were first built in 1739, and earlier in Ireland—Brocklesby found it necessary to impress upon the public the necessity for barracks for soldiers, asking "How is it possible without barracks to make a private soldier always wholesome and cleanly, further than at a stated hour on the Parade for momentary shew?" He condemned some of those barracks just built; erected, as he says, with salt water bricks, with low ceilings, and without any ventilation. He strongly advocated the observance of cleanliness, good ventilation, good diet, and regular exercise in the Army. He noted that men ill from typhus did better in ill-constructed temporary sheds where they had plenty of fresh air than in houses, and, in 1760, treated many men of the 30th Regiment suffering from this disease in wattle huts with thatched roofs, on an elevated site with straw screens on the weather side. Each hut had a fire-place. He had only one or two deaths and considered that the pure, bracing air favoured the recovery of his patients. We may note that he had the walls and ceilings frequently scraped and cleaned. He also considered that the frequent removal of the sick from hospital to hospital, with the poor means of transport then available, led to great and unnecessary loss of life. Brocklesby was the advocate of small hospitals. His book also contains some interesting "Regulations for Hospital Management." In camps we find him impressing upon us the necessity of avoiding the fouling of camp sites, and of shifting and covering in latrines as soon as they became offensive. He thought the straw on which the men lay in their tents should be turned and aired twice a week.

Brocklesby recognised the responsibility of regimental officers in matters affecting the health of their men. He says: "A faithful and judicious discharge of the duties of the Field Officers in any Regiment may obviate many diseases incidental to soldiers."

He advocated the issue of "charge pay" to medical officers in time of war.

Brocklesby's observations on the diseases incident to soldiers are clear and original. He refers to coughs, rheumatism, erysipelas, sore throats, pleurisy, gaol fever, bilious fevers, dysentery, small-pox, measles, jaundice, dropsy, vermes, psora, lues venerea, scurvy, tertian fevers and ague cake. Brocklesby had great faith in wine in the treatment of fevers, often giving as much as three pints daily to his patients.

He drew up some remarkably sound regulations for the preservation of the health of the soldiers embarking on the expedition against Manila. He recommended larger ship's tonnage in summer than in winter, in hot climates than in cold; in short voyages 1¾ tons per man, long voyages 2 to 2¾ tons. Between decks should be kept scrupulously clean and well aired with ventilators or air sails. Hammocks were to be brought on deck daily and exposed all day long if weather permitted. Ships should be fumigated frequently by plunging a heated iron into receptacles containing pitch or tar. No place between decks should be wetted after sunset. The troops were to be mustered on deck three or four times a day, and kept employed for an hour at a time. The quantity and quality of the salt meat should be looked to and fresh meat and vegetables given when in port. In hotter climates the ration should include more vegetables and sub-acid fruits and less meat. Excess in spirituous liquors was to be prohibited and sobriety enforced. According to Brigadier-General Draper, who commanded the expedition, Brocklesby's regulations "answered exceedingly well."

Brocklesby (as well as Pringle, Home, Monro and Cleghorn) was in the habit of performing *post-mortem* examinations on his patients, a practice not at that time common in civil hospitals.

The length of this memoir does not permit further reference to Brocklesby's work; the writer's aim will, however, have been gained if it arouses the interest of the army medical officers of to-day, so that when they pass the church of St. Clement Danes in the Strand, where he lies buried, they may give a tender thought to the memory of this great army physician and gentleman of the olden time.

THE NATURAL FOOD OF *GLOSSINA PALPALIS*.[1]

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As a good deal of interest, and it may be importance, attaches to the food of the tsetse fly—the carrier of sleeping sickness—the following notes are placed on record:—

In the laboratory it was found that the flies fed with far more avidity on birds than on monkeys, while they could hardly be tempted to feed on young crocodiles, iguanas, or lizards. It was very marked, this preference of theirs for birds; the moment a chicken was placed against the netting of the cage, they instantly swarmed on it in hundreds. From this it was thought probable that the natural food of the flies would prove to be birds' blood, but the two following experiments do not bear this out to any great extent:—

The first experiment was carried out in the laboratory at Mpumu, and extended over several months. Flies which had been caught on the Lake-shore and which had been kept over from the previous day, and sometimes longer, were dissected, and each portion of the alimentary canal examined in the fresh state under a low power. The various organs of the fly were then smeared separately, and after staining (with one of the modifications of the Romanowsky stain) were examined in the usual way.

The dissections were carried out as follows: The pharynx and proboscis were removed with a needle, and, having been placed under a cover-glass and slightly opened out by pressure, were examined in the fresh state. The tube of the proboscis was in this way admirably displayed, and the presence of red blood corpuscles or of flagellates could readily be determined. The alimentary canal was then removed from the abdomen, and the salivary glands detached from the fat-body. The alimentary canal was then unravelled and laid out in its full length on a slide. The whole of the tube could then be passed in review from the junction of the thoracic intestine with the fore-gut down to the

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rectum, and the contents at various levels determined, as far as possible, with medium power magnifications. The main portions of the alimentary canal were then noted, and these were separated from one another by cross cuts with a sharp-edged dissecting needle. In this way the fore-gut, mid-gut, hind-gut, and proctodæum were separately removed and smeared on a slide. The smears (whilst still moist) were exposed to the vapour of osmic acid for a few seconds, and then passed through alcohol before washing and staining. The proventriculus can, with a little practice, be removed intact from the ventral aspect of the thorax. If necessary, the thoracic portions of the salivary ducts can also be recovered.

Speaking in general terms, the contents of the various portions of the alimentary canal could be determined with considerable accuracy from the naked-eye appearance during dissection. If the fly has fed very recently, the blood oozes from its proboscis when it is handled. The proventriculus, the crop or sucking stomach, as well as the fore-gut, are greatly distended with red blood. When the fed fly is put aside the blood-cells generally disappear from the proboscis in a few hours, though they may exceptionally be found as long as twenty-four hours after a feed. Similarly, the proventriculus and thoracic intestine quickly empty themselves, and the crop discharges its contents into the upper alimentary canal within twenty-four hours.

The blood travels slowly down the alimentary canal, changing in appearance as it goes. The outline of the red cells can sometimes be distinguished three days after a feed, but only when they have been retained in the fore-gut. When the blood reaches the mid-gut it begins to disintegrate and becomes homogeneous and somewhat translucent; when it reaches the lower part of the mid-gut it first becomes dark and eventually black and tarry. When in this state all cell elements are lost, and the colouring matter of the red cells is recognizable in the form of amorphous black granules. When the contents pass posterior to the Malpighian tubes, that is, into the hind-gut, they at once become fæcal in character, and turn into a dirty, yellowish-brown material, which is microscopically composed of fine granules. It is passed from the fly in this form.

The figures given in the subjoined table refer to flies which were caught at various parts of the Lake-shore, and were generally kept for about twenty-four hours before dissection. The majority of the dissections were done during October, November, and December, 1908.

TABLE I.—THE CONTENTS OF THE ALIMENTARY CANAL OF 220 GLOSSINÆ PALPALIS

Total flies examined	Intestine empty	Intestine contained blood	CHARACTER OF BLOOD		
			Mammalian	Non-mammalian	Non-recognizable
220	160	60	20	9	31
Percentages	72·7	27·3	9·1	4·1	14·1
				27·3	

Remarks.—In two cases blood corpuscles were recognized as being derived from monkeys, as the characteristic parasites of monkey malaria were found in them.

The second experiment to ascertain the food supply of *Glossina palpalis* was modified as follows:—

A journey was made to a small peninsula, hereafter referred to as "Crocodile Point." This place was distant about two and a half to three hours by canoe from the Kibanga landing place, and lay in a sheltered bay far out of the beaten track of the canoes which come backwards and forwards between the islands of Kome, Damba, and Buvuma, and the weekly market at Kibanga clearing. It was chosen, therefore, partly because it was isolated from human influences, and also because of the large number of flies which lived there and the number of crocodiles and birds which frequented it.

When it was first visited, a large crocodile was disturbed from where she was lying outstretched on a spit of sand. The canoemen at once set to work, and unearthed 58 crocodile eggs lying in layers about 18 inches below the surface, over which the "form" of the parent was clearly defined in the soil.

The peninsula was pointed in shape, and not more than 60 yards long, and was closed on the land side by the dense wall of the forest which fringes the Lake-shore. It was scattered with light undergrowth and fringed by ambatch trees, on which flocks of divers and cormorants sat with outstretched wings drying in the sun. A barrier of bare rocks and boulders projected on one side, and a small school of hippopotami was generally to be seen floating near and basking in the sun. Many small crocodiles were disturbed from the undergrowth as the point was explored, and various kinds of small land birds frequented the reeds and shrubs. The soil was sandy loam, and shaded by the light foliage. *G. palpalis* swarmed. The place has been described at some length, so that the exact conditions may be realized.

Subsequent to this experiment, the daily catch of Lake-shore flies was obtained from this place, and incidentally it may be added that the flies caught here were regularly found to be infective to monkeys.

TABLE II.—THE NAKED-EYE APPEARANCES OF THE CONTENTS OF THE ALIMENTARY CANAL OF 183 TSETSE FLIES, WITH THEIR SEX, AND THE PRESENCE OR ABSENCE OF A LARVA.

No.	Sex	Larva	Red blood	Black blood	No.	Sex	Larva	Red blood	Black blood
1	♂	–	–	–	54	♀	–	+	+
2	♂	–	–	–	55	♂	–	–	–
3	♂	–	–	–	56	♀	–	–	+
4	♀	+	–	–	57	♂	–	–	–
5	♀	–	–	–	58	♀	+	–	–
6	♂	–	–	–	59	♀	–	–	+
7	♂	–	–	–	60	♀	–	–	+
8	♀	+	–	–	61	♂	–	–	+
9	♂	–	–	–	62	♂	–	–	+
10	♀	–	–	–	63	♂	–	–	+
11	♀	–	–	–	64	♀	–	–	–
12	♀	–	–	–	65	♂	–	–	–
13	♀	–	–	–	66	♂	–	–	+
14	♂	–	–	–	67	♂	–	–	–
15	♂	–	–	–	68	♂	–	–	–
16	♂	–	–	–	69	♂	–	–	–
17	♀	–	–	+	70	♂	–	–	–
18	♀	–	–	+	71	♀	–	+	–
19	♂	–	+	–	72	♂	–	–	+
20	♀	–	–	+	73	♀	–	–	–
21	♂	–	+	–	74	♀	+	+	+
22	♂	–	–	+	75	♂	–	+	+
23	♀	–	–	+	76	♂	–	–	+
24	♀	–	–	+	77	♂	–	+	+
25	♂	–	+	–	78	♀	–	+	–
26	♂	–	–	+	79	♂	–	–	–
27	♂	–	+	+	80	♂	–	–	–
28	♀	+	–	+	81	♀	–	–	–
29	♂	–	–	+	82	♂	–	+	+
30	♂	–	–	–	83	♀	+	–	
31	♀	–	–	+	84	♀	+	–	–
32	♀	+	+	–	85	♂	–	–	–
33	♀	–	–	+	86	♀	–	–	+
34	♂	–	–	–	87	♂	–	–	–
35	♀	–	+	–	88	♀	–	–	–
36	♀	–	–	+	89	♂	–	–	–
37	♀	+	–	–	90	♂	–	–	+
38	♂	–	+	–	91	♀	+	+	+
39	♀	–	–	+	92	♀	+	–	–
40	♀	–	–	+	93	♂	–	–	–
41	♂	–	–	+	94	♂	–	–	+
42	♂	–	+	–	95	♂	–	–	+
43	♂	–	–	+	96	♂	–	–	+
44	♀	+	–	–	97	♂	–	+	+
45	♀	–	–	+	98	♀	–	+	+
46	♂	–	–	+	99	♂	–	–	–
47	♀	–	–	+	100	♂	–	–	+
48	♀	–	–	+	101	♀	+	–	+
49	♂	–	–	+	102	♀	+	–	+
50	♂	–	–	–	103	♂	–	–	–
51	♂	–	–	+	104	♀	+	–	–
52	♀	+	–	–	105	♂	–	–	–
53	♂	–	–	–	106	♀	+	–	+

TABLE II—*Continued.*

No.	Sex	Larva	Red blood	Black blood	No.	Sex	Larva	Red blood	Black blood
107	♂	–	–	–	146	♂	–	–	–
108	♂	–	–	+	147	♂	–	+	+
109	♂	–	–	–	148	♀	+	–	+
110	♂	–	–	–	149	♀	+	–	+
111	♀	+	–	–	150	♀	–	–	+
112	♂	–	–	+	151	♀	–	–	+
113	♀	–	–	+	152	♀	–	–	+
114	♂	–	–	+	153	♀	+	–	+
115	♂	–	–	–	154	♂	–	–	+
116	♂	–	+	+	155	♂	–	–	–
117	♀	–	–	+	156	♂	–	–	–
118	♂	–	–	–	157	♂	–	+	+
119	♀	+	–	+	158	♂	–	–	–
120	♂	–	+	+	159	♀	–	–	+
121	♀	–	+	+	160	♂	–	–	–
122	♀	–	–	–	161	♀	+	–	+
123	♀	–	+	+	162	♂	–	–	–
124	♂	–	+	+	163	♂	–	–	+
125	♂	–	–	–	164	♂	–	–	–
126	♂	–	–	+	165	♂	–	–	–
127	♀	–	–	–	166	♂	–	–	–
128	♂	–	–	+	167	♀	+	–	+
129	♀	–	–	+	168	♀	+	–	+
130	♀	–	–	+	169	♀	–	+	–
131	♂	–	+	+	170	♀	+	–	+
132	♂	–	+	+	171	♂	–	–	+
133	♂	–	+	+	172	♂	–	–	+
134	♀	–	+	+	173	♀	+	–	+
135	♂	–	–	–	174	♂	–	–	–
136	♂	–	–	–	175	♂	–	–	+
137	♀	+	–	+	176	♂	–	+	+
138	♀	–	–	+	177	♀	+	+	+
139	♂	–	–	–	178	♀	+	–	–
140	♂	–	–	+	179	♀	+	–	–
141	♂	–	–	+	180	♀	+	–	+
142	♂	–	–	+	181	♀	–	–	+
143	♂	–	+	+	182	♂	–	–	–
144	♂	–	–	–	183	♂	–	–	–
145	♂	–	–	+					

In the present experiment, the observer landed by canoe and made the paddlers sit round him; the fly-boys moved about amongst them and caught the flies as they came to feed. They were handed at once to the observer, who snipped off their heads, noted their sex, and roughly dissected out the alimentary canal, and, when it contained food-stuff, smeared it at full length on a slide. Notes were made as to the naked-eye contents of the canal and the question of pregnancy. The smears were fixed in the usual way and brought to the laboratory, where they were stained and examined minutely.

The total number of flies examined was 183, of which 104 (57 per cent) were males, and 79 (43 per cent) were females; of the total number, 108 (59 per cent) contained blood in a more or less digested state, and 75 (41 per cent) contained no foodstuff. Out of the 79 females, 32 (40 per cent) contained nearly fully-developed larvæ.

TABLE III.—SHOWS THE NATURE OF THE BLOOD IN THE INTERIOR OF THE FLIES, AND ALSO THE NUMBER OF FLIES WHICH CONTAINED PARASITES.

No.	Mammalian blood	Non-mammalian blood	Trypanosomes	Halteridia	No.	Mammalian blood	Non-mammalian blood	Trypanosomes	Halteridia
1	–	+	–	–	27	–	+	–	–
2	–	+	–	+	28	–	+	–	–
3	–	+	+	–	29	–	+	–	–
4	–	+	–	–	30	–	+	+	–
5	–	+	–	–	31	–	+	–	–
6	–	+	–	–	32	+	–	–	–
7	–	+	–	–	33	–	+	+	–
8	–	+	–	–	34	–	+	–	–
9	–	+	–	–	35	–	+	–	–
10	–	–	+	–	36	–	–	+	–
11	+	–	–	–	37	–	+	–	–
12	–	+	–	–	38	–	–	+	–
13	–	–	+	–	39	–	+	–	–
14	–	+	–	+	40	+	–	–	–
15	–	–	+	–	41	–	–	+	–
16	–	+	–	–	42	–	+	–	–
17	–	+	–	+	43	–	+	–	+
18	–	–	+	–	44	–	+	–	–
19	–	+	–	–	45	–	+	–	–
20	–	–	+	–	46	+	–	–	–
21	+	+	–	–	47	–	+	–	–
22	–	+	–	–	48	–	–	+	–
23	–	+	–	–	49	–	–	+	–
24	–	+	Trypanoplasma	–	50	–	+	–	–
25	–	+	–	+	51	+	–	–	–
26	–	–	+	–	52	+	–	–	–

The above table shows that out of the original 183 flies examined, 52 (28 per cent) contained blood which was recent enough to show the red corpuscles. Out of these 52, 7 (13 per cent) were from mammalian blood, whilst non-mammalian blood was present in 35 flies (67 per cent). Trypanosomes were present in 14 flies (27 per cent), and Halteridia in 5 (nearly 10 per cent). One contained a trypanoplasma, derived, probably, from bird's blood.

An attempt was made to separate the nucleated red blood corpuscles into avian and reptilian. The distinction was made by size only, it being found from the measurement of corpuscles from birds and reptiles that the average normal length was:—

Standard amphibian (crocodile), 15·4 microns.

Standard avian (horn-bill), 13·1 microns.

In examining the smears from the flies, the average was taken of ten to twenty red cells, which seemed as natural as possible, and the average obtained in this way compared with the standard measurements. No allowance could be made for alterations due to digestive changes; these were presumed to be similar in all cases.

TABLE IV.—SHOWS THE AVERAGE MEASUREMENTS OF THE NUCLEATED RED CORPUSCLES AND THEIR PROBABLE ORIGIN.

No.	Average length of red cells, in microns	Probably reptilian or amphibian	Probably avian
1	15·3	+	—
2	14·2	+	—
3	14·1	+	—
4	13·3	—	+
5	14·4	+	—
6	14·0	+	—
7	14·0	+	—
8	14·4	+	—
9	14·5	+	—
10	13·0	—	+
11	14·8	+	—
12	14·4	+	—
13	10·6	—	+
14	13·4	—	+
15	14·6	+	—
16	13·2	—	+
17	14·0	+	—
18	15·2	+	—
19	13·2	—	+
20	13·3	—	+
	Totals ..	13	7

Remarks.— Only 20 of the flies contained nucleated blood which was recent enough to justify any deduction as to its origin. Out of these 20 flies, 13 had probably fed on a reptile or amphibian, and 7 on a bird.

TABLE V.—SHOWING THE RESULT OF THE EXAMINATION OF GLOSSINA PALPALIS FROM "CROCODILE POINT."

No. of flies	♂	♀	♀ containing larvæ	Intestine empty	Intestine containing blood	Mammalian blood	Non-mammalian blood	Non-mammalian blood: Avian	Non-mammalian blood: Reptilian	Flagellates	Halteridia
183	104	79	32	75	108	7	35	7	13	14	5
Percentages..	57	43	17·4	41	59	3·8	19·1	3·8	7	7·6	2·7

CONCLUSIONS.

Two hundred and twenty *Glossinæ palpalis* were caught on various parts on the Lake shore, and at intervals extending over several months; they were examined about twenty-four hours after capture. The examination of their intestinal contents revealed the fact that about 27 per cent contained the remains of blood, the majority of which was of mammalian origin.

In the second experiment, 183 *G. palpalis* were caught at one spot where the food supply was abundant—birds and crocodiles—and the flies were examined at once. A much higher percentage (nearly 60 per cent) contained the remains of a blood meal. The blood in the majority of the flies had been obtained from birds or reptiles, and of these the reptilian blood was twice as frequent as the blood of birds.

A SMALL EPIDEMIC OF TYPHOID FEVER CAUSED BY AN "ACUTE CARRIER."

By Major H. W. GRATTAN and Major D. HARVEY.
Royal Army Medical Corps.

As all cases which have been definitely diagnosed enteric fever (this includes fevers due to the *Bacillus paratyphosus* A) are sent to the convalescent depots at Naini Tal and Wellington, the danger from chronic carriers among soldiers may be said to have been eliminated.

We say advisedly all cases that have been diagnosed definitely, because undoubtedly there are a certain number of mild atypical cases which are not diagnosed enteric fever, and therefore are not sent to the depots but are returned to duty when physically fit; that some of these cases may be a real menace to the health of their comrades has been illustrated by the history of a recent epidemic published by us, and is also most strikingly shown by the epidemic which is the subject of this small paper.

As has already been shown by the work in the enteric depots mild and atypical cases do not furnish the "chronic carrier." These unfortunate people so far as our experience goes have invariably had severe attacks of fever usually with marked abdominal symptoms, i.e., hæmorrhage, &c., pointing to deep ulceration. On the other hand, mild and atypical cases do furnish "acute carriers;" by this term we mean men who for a few weeks or months (up to two or three) after convalescence continue to excrete the *B. typhosus* or *B. paratyphosus* A in their fæces or urine and then spontaneously cease to do so. We are aware that this term is sometimes applied to another type of carrier, i.e., a man who passes the *B. typhosus* or *B. paratyphosus* in his fæces or urine for a short time but has never had an attack of enteric fever. We have never met this type of carrier.

During the year 1910 no fewer than six "acute carriers" have been discovered in the enteric depot at Naini Tal. This was due to the fact that it is now possible to examine all men on arrival and if necessary to continue the examinations until bacilli are no longer found.

In previous years when it was only possible to examine the men after a stay of at least three months, not more than two of these cases would have been detected.

One of us who had access to the returns from all station hospitals in the Lucknow Division noted that from one station two cases of pyrexia of uncertain origin and two cases of "N. Y. D." fever were returned in one week. In view of the recent epidemic which we had studied at Naini Tal, and being aware of the extreme difficulty and indeed impossibility of diagnosing mild cases of paratyphoid fever without the refinements of bacteriological aids, a visit was paid to this station under the orders of the Principal Medical Officer, and in conjunction with the Medical Officer in charge blood cultures were taken from four cases (two in the first week of the fever and two at a later stage) and a capsule of blood for Widal's test from another convalescent fever case. As the temperature of this patient was normal it was too late to take a blood culture. The blood cultures were made in plain sterile bile (which we have found superior to Conradi's glycerine peptone bile and also to bile salt water), and were sent by post to the laboratory at Naini Tal.

From the two samples which had been taken early in the fever the *B. paratyphosus* A was isolated in pure culture, while the two samples taken later in the fever proved sterile, but ultimately the sera of these patients gave the Widal reaction which we recognize as diagnostic of paratyphoid A, this reaction has been fully described in previous notes. It was at once evident that we were dealing with a small epidemic of paratyphoid A fever.

The following men were admitted to hospital suffering from enteric fever (paratyphoid A). The dates refer to the first day of the disease.

No.	Name	Company	Date	Remarks
1	Private M.	"D"	Aug. 22, 1910	Widal positive to paratyphoid A.
2	,, Ch.	,,	,, 23, ,,	..
3	,, W.	"C"	,, 24, ,,	Widal positive to paratyphoid A.
4	,, P.	"D"	,, 27, ,,	*B. paratyphosus* A isolated from blood September 3.
5	,, H.	,,	,, 29, ,,	Widal positive to paratyphoid A.
6	,, C.	,,	,, 30, ,,	*B. paratyphosus* A isolated from blood September 3 and from fæces December 12, 1910.
7	,, Ht.	"C"	Sept. 7, ,,	Widal positive to paratyphoid A.
8	,, G.	"D"	,, 26, ,,	,, ,, ,,
9	,, Br.	,,	Oct. 13, ,,	Widal positive to paratyphoid A. *B. paratyphosus* A isolated from fæces January 4, 1911.

It will be seen from this table that the epidemic started suddenly about August 22 and ceased entirely on October 13, and no further cases have occurred up to March, 1911.

We are strongly of opinion that all cases of enteric are due to contact more or less direct with infected persons, and that the usual vehicle of infection (if any intermediary is necessary) is either food or drink, and we are also of opinion that all investigations of the origin of an epidemic should be directed towards the discovery of the infected person rather than to the intermediary.

With this end in view the sera of all native cooks and bearers employed in the company cookhouses and institutes were examined, but no indications for further examinations were detected. Among the temperature charts of recent admissions to hospital was one that had all the appearance of a mild attack of paratyphoid A fever. The man to whom this chart referred—Private K.—arrived in the station from furlough on July 15, 1910, and was admitted to hospital three days later for pyrexia of uncertain origin. He passed through a mild attack of fever, and as he apparently had no symptoms beyond the fever, and seemed perfectly fit again, he was discharged from hospital on August 5, 1910, his temperature having been normal for some days.

The first case of paratyphoid fever was admitted to hospital on August 20 from the barrack-room in which Private K. lived.

Private K. was sent for; his serum was tested and gave a positive reaction to paratyphoid A. On receipt of this report Private K. was readmitted to hospital on September 30 and diagnosed paratyphoid A fever.

The last case of paratyphoid fever occurred on or about October 12. It will be noted that cases of paratyphoid fever began to come in fifteen days after Private K. had been discharged from hospital for pyrexia, and that twelve days after his readmission the last case occurred.

Private K. was sent direct from hospital to the depot at Naini Tal, where he arrived on October 20, 1910. He was anæmic, suffered from headache, and stated that when in hospital he suffered from abdominal pains which were so severe as to necessitate hot fomentations for the relief of pain. When describing the situation and character of the pain he placed his hand over the right hypochondrium.

The examination of his fæces was commenced on October 25, and he was found to be passing the *B. paratyphosus* A almost in pure culture. He continued to pass this bacillus daily up till November 11, when he suddenly ceased to do so, and all subsequent examinations were negative.

The steps taken to identify the bacillus were as follows:—

Specimens from his fæces plated on Conradi-Drigalski's medium showed numerous blue transparent typhoid-like colonies, which clumped at once in paratyphoid A serum and not in typhoid or paratyphoid B serum. A twenty-four hour growth on an agar slope from a single colony clumped at once in paratyphoid A serum and not in typhoid or paratyphoid B serum. The usual sugars and a litmus milk tube were inoculated and at the same time a duplicate series of media were inoculated with stock paratyphoid A. The reactions of the two series were identical up to ten days. No indol was produced. The above tests were repeated with a new batch of media and the results were identical.

AGGLUTINATION AND ABSORPTION TESTS.

Serum of a rabbit which had received a series of inoculations with stock paratyphoid A :—

	20	40	100	200
Stock paratyphoid A	±	±	∓	–
K.'s bacillus	+	+	±	Trace
D.'s ,,	+	+	+	±

D.'s bacillus was a strain of paratyphoid A which had been recently isolated from the fæces of a patient convalescent from paratyphoid A fever.

The same serum absorbed with K.'s bacillus :—

	10	20	40
Stock paratyphoid A	–	–	–
K.'s bacillus	–	–	–
D.'s ,,	–	–	–

Serum of chronic carrier of paratyphoid A :—

	10	20	40	100
Stock paratyphoid A	+	±	±	∓
K.'s bacillus	+	±	∓	Trace

Same serum absorbed with K.'s bacillus :—

	10	20	40
Stock paratyphoid A	–	–	–

High titre (1-10,000) typhoid serum :—

	80	200	400	8,000
K.'s bacillus	∓	Trace	–	–
Stock paratyphoid A	±	Trace		
B. typhosus	+	+	+	+

Same serum absorbed with K.'s bacillus :—

1-4,000 tube showed immediate agglutination for *B. typhosus*.

High titre (1-10,000) paratyphoid B serum : –

	80	200	400	1,000	2,000
K.'s bacillus	±	Trace	–	–	
Stock paratyphoid A	∓	Trace	–	–	
Paratyphoid B	+	+	+	+	+

Same serum absorbed with K.'s bacillus :—

1-2,000 tube showed immediate clumping of *B. paratyphosus* B.

To accept any bacillus *isolated from fæces* as a paratyphoid bacillus without putting it through some such series of tests as the above, is to run great risks of making mistakes.

It will be noticed that out of the ten men (including Private K.) who suffered from paratyphoid fever eight belonged to D Company. One of the men, Private H. T., who belonged to C Company, was admitted to hospital on August 8, 1910, for venereal disease, and as there were only two wards in the hospital he was for a time accommodated in the next bed to Case No. 4, Private P. Private H. T. developed fever on September 9 while still in hospital, and passed through a fairly severe and typical attack. As there were only two companies of the regiment in the station, men of D and C Companies were on guard at the same time, had meals together and were in close contact; the other case in C Company may thus be accounted for.

THE PARATYPHOID PROBLEM IN INDIA.

By Brevet-Colonel R. H. FIRTH.
Royal Army Medical Corps.

Since Schottmüller first described the two bacilli *paratyphosus* A and B, not only these two micro-organisms, but others of a closely allied nature, have been a source of interest and doubt to bacteriologists. It is only within the last two years that an advanced laboratory technique has enabled workers to evolve some orderly conception of their real nature, rôle and position in the bacterial world. Even now, the last word remains to be said on these points. As regards the precise nomenclature to be applied to, and exact definitions to be made of the pathological and clinical entities which these bacilli respectively cause, it must be admitted there remains still much to be done. Towards the solution of this question officers of our corps have unrivalled opportunities to contribute, and the main object of this article is to advance a plea for exact observation and serious attention to the problem of paratyphoid fever which now confronts us, especially in India. Unfortunately, little help and information is forthcoming from European workers. The point of view at home seems to be somewhat limited, apparently owing to the comparative rarity in Europe of the A variety of the paratyphoid bacillus, and the prominence accorded to infections by the B variety, as exemplified in the investigations of acute enteritis and other explosive infections associated with so-called food-poisoning. We need to approach the subject from an independent and wholly unbiassed standpoint, observing and recording facts and, in this manner, filling gaps in knowledge. The results can only be good and creditable to us as a scientific corps.

The type of infection known as paratyphoid fever is now a source of anxiety to the administration in India. There can be no question as to the prevalence of the disease in that country, in fact, we have reason to think that it prevails much more than many suppose, and certainly far more than our statistical returns suggest. Taking the medical transactions of the various hospitals for European troops for 1910, we find forty-four recorded cases presenting strong presumptive evidence of being paratyphoid fever. On critical revision of the statistical returns, as based on final diagnosis, the official figures for 1910 show thirty-nine cases of paratyphoid fever. Of these, thirty-five occurred in men who had been inoculated against enteric fever. There was one death. We say, again, that we do not consider that these figures represent truly the exact incidence of the infection; there is much to suggest that 100 cases would more accurately represent the real facts. Many of the paratyphoid cases are returned under the head of enteric fever, and a certain number are returned in the group "pyrexia of uncertain origin." The reason is the circumstance that cases are not allowed to be diagnosed and returned as paratyphoid fever, unless the specific micro-organism has been isolated from the case. This is a high standard or criterion of differentiation; it has great advantages and some drawbacks. The isolation of the bacillus is by no means easy and certainly not possible in all cases, in spite of the employment of a modern technique. It follows that a certain number of cases of undoubted paratyphoid infection are returned as either cases of enterica or cases of pyrexia of uncertain origin. We admit the situation is one of difficulty, and there is much to be said in favour of the diagnosis of these cases on general clinical and epidemiological data, even if the specific micro-organism has not been isolated. We do so in regard to enteric fever, and it is logical to apply the same practice to the paratyphoids. So conscious has the administration been of the anomaly, and of the consequent weakening of its powers of control over this infection that, even when not diagnosed as such, it has ordered that all cases, which on clinical and epidemiological evidence only are suggestive of being cases of paratyphoid fever, are to be assumed to be instances of such infection, treated as potentially infective, and sent to the enteric fever convalescent depots for observation.

A matter of practical importance is how far, in the absence of any isolation of the incriminating bacillus from these cases, reliance can be placed upon the clinical symptoms for diagnosis. If taken in conjunction with the epidemiological facts, Indian experience is favourable to the view that the possibility of error is small. It is true that the clinical symptoms are not capable of sharp demarcation from those which are so characteristic of enteric fever; but the occurrence of an irregular pyrexia of comparatively short duration, that is from ten to sixteen days, coupled with a sudden onset of which the outstanding feature is severe frontal headache and occasionally lumbar pain, if taken in conjunction with other symptoms suggestive of a mild typhoid or influenzal attack, is strong presumptive evidence in favour of the view that we are dealing with a case of paratyphoid infection. The low case mortality of these cases is characteristic.

It must be admitted that the isolation of the specific micro-organism from these cases removes all doubt, and renders us independent of fine distinctions in the reading of mere clinical symptoms; still, as explained above, there are grave practical difficulties in the way of a successful isolation of the bacillus in all cases. The evidence is remarkably strong that, in paratyphoid infection, the dominant agent in its dissemination is man himself; that is, we are dealing with a type of infection in which acute carriers are common, but probably for only short periods. This being so, it is all the more necessary to secure the early detection and segregation of cases. If we do diagnose and segregate a few cases which are not instances of the true paratyphoid infection, we shall err on the safe side in that the chances of a real case being overlooked and left at large will be correspondingly lessened. This is our present official attitude towards the question and we believe it to be sound.

As regards the identity of the infecting bacillus in paratyphoid fever, the majority of our Indian cases have been due to the *B. paratyphosus* A. The evidence in support of this statement is undoubted. During 1910, three cases were reported as yielding a micro-organism which was described as being the B variety. We are not satisfied on this point. In fact, the evidence in support of paratyphoid fever being caused in India by the *B. paratyphosus* B rests on unsatisfactory data. We are not aware of any case of pyrexia occurring in India from which a micro-organism has been isolated that has been satisfactorily demonstrated to be the *B. paratyphosus* B. It is obvious that this question of identity is a matter of the first importance. The sources of error are well known, and unless observers and others who report these cases employ critical methods for differentiation we shall never advance towards knowing exactly what is meant by paratyphoid fever, and what particular micro-organism is the causative agent. The number of cases from which either variety has been isolated being small, to be exact thirty-nine cases in the last year, we do not wish to be dogmatic on the point; but, taking the evidence as we find it, its weight is strongly in support of the view that, when we speak of paratyphoid fever, we mean an infection by the A variety of the *B. paratyphosus*.

It may be asked, how comes it that there is difficulty on such a fundamental point? The reason turns largely on the doubts which have existed as to the precise biological status of the B variety of the *B. paratyphosus*. It is probable that the last word has still to be said, but recent work has done much to clear up ambiguities. Even now, some confusion still exists as to whether what is called *B. paratyphosus* B by some observers is not really another micro-organism altogether, namely, the *B. suipestifer*. This confusion of thought is very apparent in European literature on the subject. The work of Bainbridge and O'Brien[1] has shown that, under the name of *B. paratyphosus* B, we have had two organisms described as one. It is only by the adoption of critical methods, such as Castellani's absorption reaction, that differentiation is possible. The same errors are probably being committed in respect ot the paratyphoid bacilli isolated from so-called paratyphoid fever cases in man. Again, there is looseness of nomenclature apparent in the designation of clinical and epidemiological entities. One man describes a case of acute enteritis, with vomiting, fever and collapse, the result of the consumption of some heavily infected food, and frequently fatal, as paratyphoid fever; precisely the same term is applied by another man to a mild pyrexia simulating enteric fever, marked by no acute gastric or intestinal symptoms, and rarely fatal. Both men say that they have isolated from their cases the B variety of the paratyphoid bacillus, and both men call the cases instances of paratyphoid fever. Here, there is obvious confusion of thought and possibly of fact. Our Indian cases present none of the features of the food-poisoning or acute enteritis group to which European writers frequently apply the term paratyphoid fever, neither do they appear to be caused by the same micro-organism. We have examined critically the reports of all cases in India, returned as being infections by the B variety of the paratyphoid bacillus, and find no resemblance in symptoms to the cases of infection described in England and reported as due to *B. paratyphosus* B. Either the incriminating organism is able to produce totally different symptoms in man in England to those it can produce in India, or the two classes of cases are due to quite distinct micro-organisms. We confess to the opinion that what is called the *B. paratyphosus* B does not belong to the paratyphoid group, but rather to the food-poisoning group, and that the symptoms it gives rise to in man are not those of paratyphoid fever. Conversely, the *B. paratyphosus* A is not associated with symptoms of vomiting with acute enteritis, collapse and other signs of food-poisoning, but causative of the clinical and epidemiological entity which we describe as paratyphoid fever. We have no wish to be dogmatic, and are prepared to accept evidence in paratyphoid fever of infection by both varieties of the paratyphoid bacillus. At present, the evidence seems singularly weak and inconclusive that paratyphoid fever is caused, in India or South Africa, by an organism other than the *B. paratyphosus* A. McNaught's[2] paper on paratyphoid fever in South Africa describes a clinical entity practically identical with our Indian cases, but his claim that the organism, isolated from the cases, is *B. paratyphosus* B is not supported by definite proof. Apart from this, the symptoms observed in South Africa are quite unlike those recorded in England as being associated usually with the B variety of the bacillus. The fact is, the whole question is in a most unsatisfactory state, and the inference we draw is that an error is being made by those who profess, or think, they have found the *B. paratyphosus* B in paratyphoid *fever*. It is for a settlement of this suggested doubt that this article is primarily a plea.

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[1] Bainbridge and O'Brien, "On the paratyphoid group of Bacilli," *Journal of Hygiene*, March, 1911; *see also* in same Journal and date, paper by Bainbridge and Dudfield on "An Outbreak of Acute Gastro-enteritis caused by *B. paratyphosus* B."

One of the most serious hindrances to accurate diagnosis and a right appraisement of the extent to which paratyphoid infection prevails has been the tendency, on the part of medical officers, to attach excessive importance to the clinical serum reactions. While the accepted teaching in regard to the serum reactions holds good, so far as infections by the enteric fever micro-organisms are concerned, it does not hold good when dealing with paratyphoid infections. The home or European teaching on this question, seems to need revision, especially in the light of Indian experience. As illustrative of the difficulties of the situation, it may be remarked that the serum reaction is invariably raised for the *B. typhosus* in cases of infection by the *B. paratyphosus* A, especially during the first week of the fever, and may be quite as high for the former bacillus as that shown during an attack of ordinary enteric fever. The reaction against *B. paratyphosus* A is usually low, say 1 in 20 to 1 in 40, and commonly transient. In paratyphoid infections the group agglutinins for *B. typhosus* also disappear rapidly, in contrast to the persistence of the specific agglutinins which follows a true enteric fever infection. This explains why the apparent anomaly is met with of a man passing through what is described as a fever clinically typical of true enteric fever, and yet giving, a few weeks later, an entirely negative serum reaction to the

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[2] McNaught, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, May, 1911.

B. typhosus. Such a case is probably one of infection by the *B. paratyphosus* A. In some cases also of undoubted paratyphoid infection, the paratyphoid reaction may entirely disappear, leaving a raised reaction for the *B. typhosus.* Again, but rarely, the reaction against the paratyphoid bacillus A may remain raised without any agglutinins being present for the enteric fever organism. Similarly, cases are met with in which both reactions are so slight or transient, during the fever and convalescence, as to be overlooked and returned as negative.

Some valuable information as to the behaviour of sera in cases of paratyphoid infection has been furnished by Major Harvey and Captain J. L. Wood, both of the Royal Army Medical Corps, who have been in charge of the Enteric Fever Depot at Naini Tal, and their work indicates that, in cases due to the *B. paratyphosus* A, when the serum agglutinates both that bacillus and the enteric fever bacillus, absorption with the former removes all the agglutinins; whereas absorption with the latter removes only the agglutinins for the *B. typhosus,* and does not remove the paratyphoid agglutinins, even though they may have been active only at a 1 in 20 dilution before treatment. The same workers show that in the case of a man who has been inoculated against enterica, and whose serum gave a positive reaction to the *B. typhosus* before his paratyphoid fever, then absorption with the *B. paratyphosus* A will only reduce the agglutination *titre,* as it fails to remove those agglutinins due to the inoculation which are specific for the *B. typhosus.* In the same way they show that in cases due to simple infection with *B. paratyphosus* A, when the serum agglutinates the *B. typhosus* only, then absorption with *B. paratyphosus* A will remove these agglutinins; whereas the agglutinins for *B. typhosus,* due to an infection with that micro-organism, are not removed by absorption with the *B. paratyphosus* A. The same workers show also that another difference between the specific and the group agglutinins for paratyphosus A is that when the serum and emulsion are put up in a sedimentation tube, the specific agglutination appears almost immediately, while the group agglutination does not appear for some hours. It is probable that the group agglutinins for the *B. paratyphosus* A are rarely present. Another fact, not generally known, is that in a case of paratyphoid fever, from which the bacillus A. has been isolated and clearly due to infection by that micro-organism, it is possible for the patient's serum to show in the early stages of the infection a rise of agglutinins both for the *B. paratyphosus* B and for the *B. typhosus,* and none for the *B. paratyphosus* A. A case of this kind has been reported to us by Wood and affords instructive information.

It will be seen that unless due regard be paid to these curious anomalies, innumerable pitfalls are in the way of the careless worker who trusts to clinical serum reactions only. These technical details, together with the need for direct cultures from the blood in cases of pyrexia of doubtful origin, and the fallacies underlying too great a reliance on serological observations, have been brought to the notice of all medical officers in military employ in India. It rests with them to make good use of the information. We anticipate as the outcome of this knowledge and the greater utilization of laboratory methods in the diagnosis of fevers of uncertain origin, a greater accuracy in our returns and the returning of a greater number of cases of paratyphoid fever than has been the case up to the present. In fact, we anticipate the collection of data during the next year or so which may seriously modify our hitherto accepted views concerning enterica in India. We admit there is much still to be learnt regarding the paratyphoid infection more particularly; but if this article is not misunderstood, from the present point of view it seems desirable, above all things, that we think clearly and obtain accurate facts. Our present facts suggest the use of the expression "paratyphoid fever" for cases of fever in which the causative micro-organism is the *B. paratyphosus* A, and that we should describe as "food-poisoning," or kreatoxæmia, those explosive outbreaks of enteritis in which the causative micro-organism would seem to be either the *B. paratyphosus* B or the *B. suipestifer*, or the other closely allied organism, the *B. enteritidis* of Gärtner. Time and labour alone can show how far these conceptions are right or wrong. We are attempting an organized inquiry as to the nature of the apparently causative micro-organisms isolated from the pyrexias of uncertain origin in India, and we hope that all officers of our Corps will help in the definite solution of a question which is of the first importance.

PARATYPHOID FEVER IN INDIA.

By Major H. W. GRATTAN and Captain J. L. WOOD,
Royal Army Medical Corps.

Recent experiences, as the outcome of the application of modern laboratory methods in the diagnosis of the pyrexias, have emphasized the extensive prevalence of paratyphoid infection among European troops serving in India. The question of paratyphoid fever has received, and is receiving, considerable attention in Europe. Judging by some recent papers on the subject,[1] we infer that European writers are more or less unanimous in applying the term paratyphoid fever to the infection caused by the *Bacillus paratyphosus* B, and that they regard this micro-organism as the most common representative of the paratyphoid bacilli to be met with in, so-called, paratyphoid fever as observed at home and in Europe generally. We believe that it is not generally recognized that paratyphoid fever is widespread in India, and, further, still less appreciated that the causal micro-organism of the paratyphoid fever of India is not the B variety, but the *B. paratyphosus* A. The records of cases due to the B variety in India, where the diagnosis was based on the isolation of this micro-organism from the blood, are very few and not free from criticism. The Enteric Fever Commission in India, 1906-8, described two cases of fever due to the *B. paratyphosus* B; in one case the bacillus was isolated from the urine, and the blood serum of the other case in a dilution of 1 in 1,500 agglutinated the bacillus. The present paper contains the results of our own experiences and is a plea for a wider view, if not an actually different view, as to what is the cause of the clinical entity we call paratyphoid fever. Before we discuss the definition, symptomatology and epidemiology of paratyphoid fever in India, it may be useful to refer briefly to some previous literature on the same subject.

Paratyphoid fever has been recognized in India only since the causal micro-organisms were isolated from patients by the members of the Enteric Fever Commission of 1906-8, when the *B. paratyphosus* A was isolated from four patients.[2] In the cold

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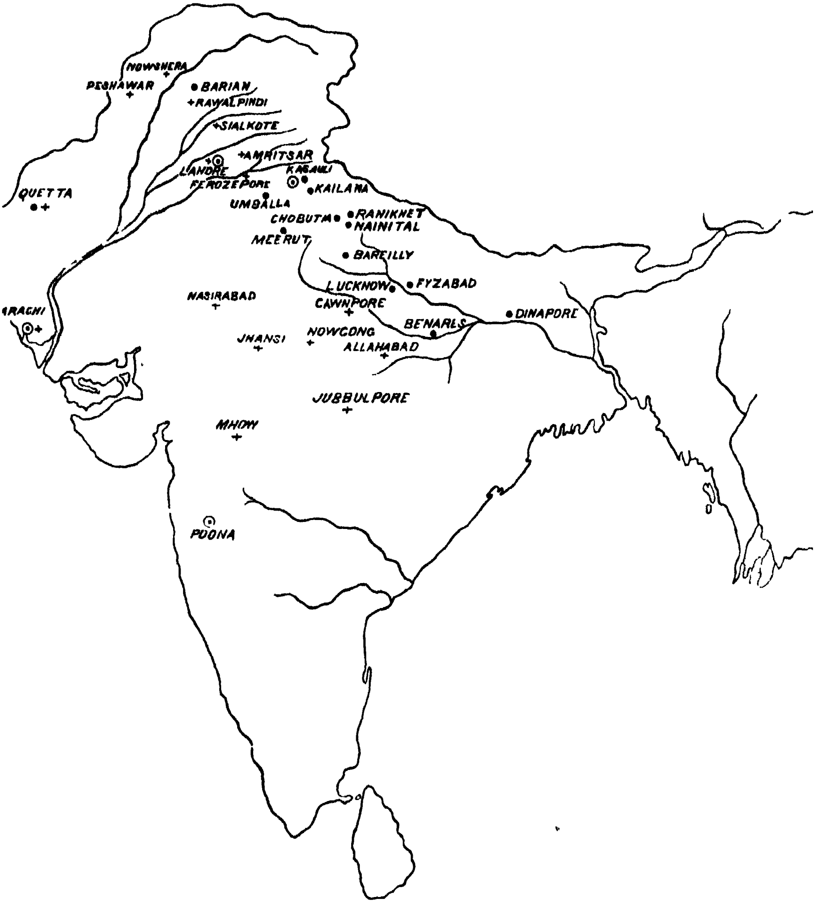
[1] See papers by Bainbridge and Dudfield, Bainbridge and O'Brien; also by Trommsdorff, Rajchman and Porter in *Journal of Hygiene*, vol. ix, No. 1, March, 1911.

[2] "Scientific Memoirs," issued by Government of India, N. S., No. 32, 1908.



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The spot ● indicates stations where men have contracted paratyphoid fever and from whom the *Bacillus paratyphosus* A was recovered at the time or during convalescence, and was identified in this laboratory.

The spot ⊙ indicates that this bacillus was recovered from the blood of patients, and was identified in other laboratories.

The cross + indicates stations where men have contracted a fever which produced in their blood agglutinins for *B. paratyphosus* A. The charts and case sheets of these patients were in keeping with the diagnosis of paratyphoid fever suggested by the Gruber-Widal reaction.

weather of 1908-9, Captain Morrison, I.M.S., isolated the *B. paratyphosus* A from the blood of two cases in Lucknow. One of us also cultivated the same micro-organism from the blood of two patients at Bareilly about the same time. In 1909, Major D. Harvey, R.A.M.C., described ten cases of paratyphoid fever due to the A variety of the bacillus, which had been isolated from the blood or excreta of these patients at Naini Tal.[3] Further, in 1910, Major D. Harvey and one of us described a small epidemic of eight cases of paratyphoid A infection at Naini Tal, the causal organism having been isolated from the blood of seven of these patients.[4] Lately, the same writers investigated a similar outbreak at Benares caused by an acute carrier.[5]

DEFINITION.

In this paper, where writing of paratyphoid fever, we refer entirely to fever caused by the *B. paratyphosus* A, unless the contrary is stated, and, in attempting to define paratyphoid fever, we would describe it as an acute septicæmic fever due to the presence in the blood stream of the *B. paratyphosus* A. It is a fever which varies clinically within wide limits, from the ambulant case on the one hand, which does not come under the notice of the medical officer, to the severe case on the other hand, which is diagnosed as enteric fever clinically, and from which disease it can only be differentiated by bacteriological methods.

SYMPTOMATOLOGY.

The incubation period, which is marked by headache and general malaise, is about the same as in enterica; but as the period varies in this disease, chiefly, we imagine, according to the dose and virulence of the bacillus coupled with the resisting power of the patient, so it varies in paratyphoid fever. We have recovered the bacillus from the blood of two patients who undoubtedly contracted the fever within ten or fourteen days of landing in India. We are of opinion that the average incubation period is fifteen days.

The onset is gradual—the patient complains of severe frontal headache and pains in the back and limbs; the attack might easily be mistaken for the onset of influenza, or even rheumatic fever.

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[3] JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, April, 1910.

[4] *Ibid*, January, 1911.

[5] *Ibid.*, August, 1911.

In about half the cases there are symptoms of bronchitis and sore throat. The conjunctivæ are suffused and the tongue is moist and furred. When the temperature is recorded from the commencement of the illness the characteristic "staircase" rise is seen and it reaches its maximum by the fifth or seventh day. The fever does not rise as high as in enterica, 102°·5 to 103°·5 being the average highest points reached. The fall is by lysis and reaches normal about the ninth to the fourteenth day. The pulse differs from that of enterica, it is more rapid and more in keeping with the temperature. A pulse of 112 per minute is quite a common feature, in contrast to the slower pulse of enterica, and is not so much an indication of a severe attack of the fever as would be the case in the more serious disease.

The respirations are increased in proportion to the degree of lung complications present. The abdomen is slightly distended and the abdominal reflex is absent, some enlargement of the spleen and liver may be noticeable. Constipation is the rule. We have observed a variety of rashes (in addition to "rose spots") of a morbilliform, erythematous and purpuric character; a rash is not so common as in enterica. Epistaxis occasionally occurs.

Patients are not nearly so dull and heavy as in enterica, they are much brighter, and take more interest in their surroundings. The above is a description of an ordinary case of the fever (*vide* Chart 4). We recognize two other distinct types: (2) the mild, and (3) the severe.

In a mild attack, the patient may report sick with "a touch of fever," which may easily be mistaken for malaria. Chart 1 illustrates such a case, which would have been overlooked if the *B. paratyphosus* A had not been isolated from the blood. This patient was not at all ill in the ordinary sense of the term.

The severe type is clinically indistinguishable from an attack of enterica. The fever lasts from twenty-one to thirty-six days, and may be accompanied with all the clinical manifestations of ordinary enteric fever, and occasionally with those of a severe attack of that fever (*vide* Chart 2). Toxæmia, however, is not so marked as in the more serious disease, and convalescence is more rapid.

COMPLICATIONS.

The very mild attack may be followed by a relapse, and in our experience the relapse is more common than in enterica, probably on account of the smaller amount of care taken with regard to food, &c., both by the patient and attendants, owing to the mild nature of the disease and the rapid convalescence. In many cases the relapse begins with a sudden rise of temperature, tenderness over the gall-bladder, and a "dysenteric" attack. The abdominal reflex is diminished, or lost during the relapse.

Phlebitis and "Enteric Leg" are almost as common as in enterica. Perforation occurred once in our experience (the *B. paratyphosus* A was recovered from the gall-bladder).

Cholecystitis is not uncommon and manifests itself by acute pain over the gall-bladder and a sharp rise of temperature. Chart 5 illustrates the type of fever associated with this condition.

Anæmia.—An ordinary attack of the fever may produce a degree of anæmia (as judged by the appearance of the patient) quite out of proportion to the severity of the disease.

Pneumonia and Bronchitis are common, but are in reality part of the disease and hardly complications.

Laryngitis.—We have seen one case of laryngitis with partial loss of voice. We have not observed peripheral neuritis or arthritis.

MORBID ANATOMY.

We only know of three cases which died from paratyphoid fever and in which the diagnosis was made certain by blood culture. In only one of these cases was a post mortem examination made. In this instance the man died from perforation of the only ulcer which could be found at the autopsy. The Peyer's patches were not obviously enlarged, but the lower part of the ileum showed signs of inflammation, the spleen weighed 6 oz., the wall of the gall bladder was thickened, and on microscopical examination its lining membrane was found to be the seat of a small round cell infiltration. The bile contained a pure culture of *B. paratyphosus* A.

BACTERIOLOGY.

The isolation of the causal organism from the blood stream is a comparatively easy matter during the first four or five days of the pyrexia. The chances of a successful blood culture are greatly diminished by the eighth day, even when the usual 5 cc. of blood is withdrawn—in marked contrast to the case in enterica. We prefer to use sterilized ox bile as the culture medium, and after twenty-four hours incubation sub-cultures from the mixture of blood and bile are made on to the original Conradi-Drigalski medium. All the members of the typho-colon group grow readily on this medium and are not inhibited, as is the case on the more modern selective media. After a further twenty-four hours incubation the colonies are tested with sera specific for *B. typhosus*, *B. paratyphosus* A, and *B. paratyphosus* B. The *B. paratyphosus* A is indistinguishable in appearance from *B. typhosus* on Conradi-Drigalski plates.

Characters.—A non-Gram staining short motile bacillus, which is agglutinated at once by specific serum. In media composed of 1 per cent peptone and 0·5 per cent sodium chloride in water to which 1 per cent of the following sugars and alcohols have been added, the bacillus gives the following reactions in twenty-four to forty-eight hours, which do not alter up to ten days, although some re-absorption of gas may take place and fluorescence disappear.

Glucose	Lactose	Mannite	Cane sugar	Dulcite
Acid and gas	No change	Acid and gas	No change	Acid and gas

The amount of gas formed in glucose is small, the Durham's tube may show none, or at the most be a quarter full of gas. There may be no change in dulcite for two or three days when abundant gas is formed. The amount of gas formed in Mannite varies from a fourth to complete filling of the tube. In neutral red glucose agar shake cultures, gas is always shown by splitting of the media. Fluorescence is variable. Litmus milk is not clotted in ten days. and the primary acidity noted is permanent. Indol is *never* formed in peptone water as tested with the paradimethylamidobenzaldehyde and persulphate of potassium test after ten days incubation. We consider these tests sufficient in the case of an organism isolated from the blood. In our experience organisms giving all the above reactions in "sugars" and which are agglutinated microscopically at once by specific paratyphoid A serum occur in the fæces, but they are not necessarily paratyphoid A bacilli, and need further differentiation.

We differentiate such bacilli by the absorption method of Castellani, which we carry out as follows. A twenty-four hours growth of the suspected organism on agar is emulsified in about 0·2 cc. of paratyphoid A serum; the dilution of the serum is varied according to its *titre*, the object being to have an excess of bacilli for the amount of agglutinins present—for example, the *titre* of our serum is 1 to 300 and we use a 1 to 10 dilution of this serum. The emulsion is incubated for two hours at 37° C. and then centrifuged, the clear supernatant serum is put up in a series of dilutions in sedimentation tubes and its agglutinating power tested against our stock *B. paratyphosus* A. If the organism tested be *B. paratyphosus* A, then the specific agglutinins are completely removed. Before accepting a suspected organism we require that it shall completely remove the agglutinins specific for *B. paratyphosus*

A. As controls we have frequently tested heterologous organisms such as *B. typhosus*, *B. paratyphosus* B, and *B. coli*, against our *paratyphosus* A. serum, but have never removed the specific agglutinins for *B. paratyphosus* A.

SERUM DIAGNOSIS.

As in enterica so in paratyphoid fever, the phenomenon of agglutination of the causal organism by the patient's serum is seen, but with, we think, a marked difference in degree, time of appearance, and permanency of the agglutinins. Antityphoid inoculation, as far as we have observed in some hundreds of cases, seldom if ever produces any agglutinins for *paratyphosus* A, with the result that a positive agglutination for this organism in a dilution of 1 to 20 is in our opinion very strong evidence of the nature of the patient's fever. A difficulty in diagnosis arises owing to the fact that if the serum of an inoculated patient is tested against *B. typhosus* alone, the agglutination *titre* is found to rise considerably, though the cause of the disease is the *B. paratyphosus* A, as proved by the isolation of this organism from the blood. Speaking generally, we would say that in an inoculated man suffering from paratyphoid fever, the original agglutination *titre* of his serum to *B. typhosus* due to his inoculation rises about the eighth day and reaches its maximum about the eighteenth, thereafter gradually declining during the next three months, whilst the agglutinins for *paratyphosus* A do not appear much before the twelfth day, reach their height about the twenty-fourth day, and totally disappear within two months.

Many authorities state that the organism which is agglutinated in the higher dilution by the patient's serum is the causal organism of the fever, and recommend this means of differential diagnosis between enterica and paratyphoid fever. In our opinion this will lead to a large percentage of errors in diagnosis, especially if only one or two observations are made. For example, we have seen cases of paratyphoid fever in which agglutination for *B. typhosus* was marked, and that for *B. paratyphosus* A absent even in 1 to 10 dilution throughout the disease (*vide* Chart No. 3). Again, we have met with cases in which the paratyphoid agglutinins never reached the high level of the enteric agglutinins, and still another type of case (severe) in which first the one and then the other organism agglutinated in the higher dilution (*vide* Chart No. 2). In this chart the .—.— line shows the agglutination curve for *B. typhosus*, and the ---- one that for *B. paratyphosus* A. In all these fevers the diagnosis was made by the isolation of the *B. paratyphosus* A from the blood.

In cases which showed agglutination both for *B. typhosus* and *B. paratyphosus* A we have attempted to demonstrate which was the specific agglutination as the result of the fever, and which was the group agglutination. Our method has been as follows: the patient's serum was diluted 1 to 5, and was divided into three portions. In one portion a thick emulsion of *B. typhosus* was made, in another, *B. paratyphosus* A was emulsified, and the third portion was kept as a control. These emulsions were left on the bench for twenty-four hours and then centrifuged. The agglutination power of the clear supernatant serum was then ascertained against the two organisms, this being also done with the control. We expected to find that absorption of the serum with *B. typhosus* removed all the agglutinins in the case of a convalescent enteric patient and *vice versa*, with the reservation that in the case of an inoculated man, absorption of his serum with *B. paratyphosus* A would not entirely remove the agglutinins for *B. typhosus* due to his inoculation. Unfortunately this test when applied in known cases of enterica or paratyphoid (proved by blood culture) gave results which were not in accordance with the theory, and hence we abandoned the test.

EPIDEMIOLOGY.

The question of the epidemiology of paratyphoid fever is one about which all that has been written with regard to enterica may be equally well applied. We have reason to believe that the disease is widespread in India (see map, p. 144). The grounds for this belief are that we have been informed that fevers of seven to ten days duration occur in all the military divisions of India, and from our own observations on such fevers in the Lucknow and Meerut Divisions a large majority of them are paratyphoid fever. For example: During the last twelve months 126 blood cultures have been received in the Lucknow Divisional Laboratory for examination, and in spite of the fact that in many of the fevers the cultures should have been taken earlier, positive results were recorded in fifty-four cases. The *B. typhosus* was isolated thirteen times and the *B. paratyphosus* A forty-one times.

It is difficult to speak with any certainty of the protection afforded against this disease by our present anti-enteric inoculation. Theoretically, this should protect to some extent, but in practice, whilst enterica has decreased we find that since the introduction of modern methods of diagnosis (blood culture), a large proportion of cases hitherto returned as simple continued fever and pyrexia of uncertain origin are, in reality, paratyphoid. What we mean by theoretically is, that if experiments be carried out on healthy men who are inoculated against enterica, we can demonstrate specific amboceptors to paratyphoid in apparently equal amounts to the specific amboceptors to *B. typhosus*, though the man had never had paratyphoid.

THE CARRIER.

By the term "chronic carrier" we mean a patient who continues to excrete the *B. typhosus* or *B. paratyphosus* for more than three months after the termination of his fever. During 1910-11, at Naini Tal Convalescent Enteric Depot, ten carriers were detected out of 157 convalescent paratyphoid cases. Only one of these carriers was chronic, according to the above definition, and this man ceased to excrete the bacillus within five months. It will be remembered that in enterica the chronic carrier occurs in about 2 per cent of all cases. Accounts of two outbreaks of paratyphoid fever in India, both of which were traced to acute carriers, have been published; reference was made to these at the beginning of this article.

From the above facts it will be noted that whereas the chronic paratyphoid carrier is uncommon, it is not so in the case of the acute carrier. An epidemiological feature which applies to paratyphoid much more strongly than to enterica is the comparative mildness of the great majority of the cases and the small death-rate as compared with enterica. This brings several interesting points into view; in the first place, owing to the mildness of the disease in some instances, patients are not diagnosed paratyphoid, but influenza, tonsillitis, pyrexia of uncertain origin, rheumatism or pneumonia, with the result that they are sent out of hospital within a few weeks of going sick, and may return to barracks while still infectious. In the second place, such convalescents are frequently sent with other debilitated men to the hills during the hot weather, and thus the hill stations where men of several corps mix together may serve as distributing centres of the disease. Furthermore, the ambulant case is a reality, and of such we give the following example.

Some cases of paratyphoid fever having occurred in a battery of Artillery during March, 1911, a preliminary attempt was made to pick out a carrier before examining each man *seriatim*. Every man was asked if he had recently had fever, and his medical history sheet was examined. It was noted that two men in room A and five men in room B looked debilitated without any apparent cause.

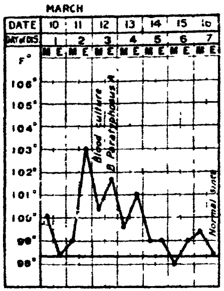
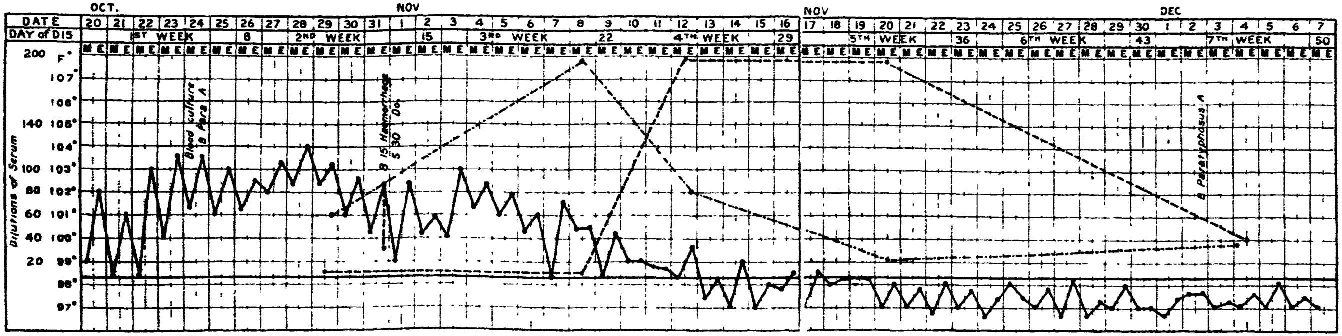


Chart 1.—To illustrate a mild case.



—•— shows agglutination to *B. typhosus*
- - - - shows agglutination to *B. paratyphosus* A

Chart 2.—To illustrate a severe case of Paratyphoid Fever.

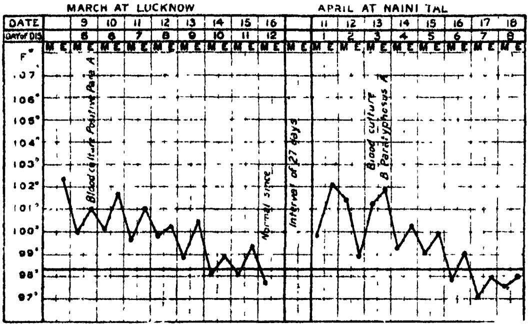


CHART 3.—To illustrate a mild case followed by a relapse, with negative Grüber-Widal reaction *B. paratyphosus* A, both during the primary attack and the relapse.

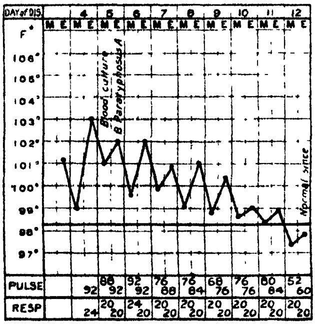


CHART 4.—To illustrate the common type of fever.

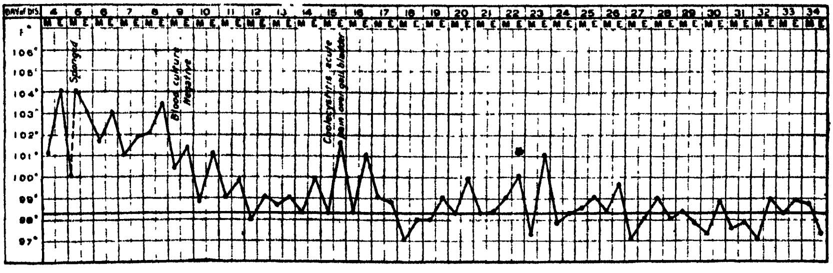


CHART 5.—To illustrate type of fever associated with cholecystitis in an acute carrier.

Their blood was therefore tested for agglutination against *B. paratyphosus* A, but with a negative result, on March 8. Between this date and March 20 the serum of every man in room B was tested in a similar manner, also with a negative result. We then passed on to examine the occupants of room A, and, by mistake, omitted to tell the medical officers, who kindly obtained the blood capsules for us, that we had already examined the blood of two debilitated men in this room on March 8. Thus it came about that the blood of one, Bombardier J., was tested a second time with an interval of twenty-one days between the observations. At the second observation on March 29 his blood agglutinated *B. paratyphosus* A in dilutions of 1 to 10, 1 to 20, and 1 to 40. Bombardier J. was sent for, and he then stated that he had felt ill for ten days; his symptoms being those which we associate with paratyphoid fever. He was sent to hospital, and thence transferred to Naini Tal Enteric Convalescent Depot. The examination of his excreta was commenced on April 11, and the *B. paratyphosus* A was recovered from his stools on April 11, 12, and 14; all subsequent examinations being negative. The organism gave the cultural reactions of *B. paratyphosus* A, absorbed all the agglutinins for *B. paratyphosus* A from specific serum, and furthermore, after injections into a rabbit, produced specific agglutinins for our stock *B. paratyphosus* A.

When investigating an outbreak, one is frequently struck by the apparent lack of any common factor in the immediate past history of the patients. To illustrate this point we give a list of men in a recent epidemic in the order in which they fell ill :—

Number	Patient	First day of illness	Regiment or Corps
1	Pte. H.	Feb. 11	8th Hussars.
2	,, B.	,, 21	King's Own, H. Company.
3	,, M.	,, 23	Highland Light Infantry, G Company.
4	,, T.	,, 24	King's Own, B Company.
5	,, T.	March 2	King's Own, Band.
6	Gr. S.	,, 2	U Battery, R.H.A.
7	,, J.	,, 2	,, ,,
8	,, R.	,, 3	,, ,,
9	Pte. W.	,, 4	King's Own, Band.
10	,, B.	,, 7	U Battery, R.H.A.
11	Dr. M.	,, 9	20th Battery, R.F.A.

Every European corps in the station was thus represented.

The difficulty of tracing the source of such an outbreak must be evident. What we think usually happens is as follows. An epidemic is started from one acute carrier, the nature of whose illness is not recognized owing to its mildness. He infects other men, some of whom are recognized as cases of paratyphoid; others, again, are not diagnosed, and possibly others never report sick at all. These men soon return to barracks and come in contact with other men in soldiers' homes, &c., and, though probably only infectious for a few days, manage thus to disseminate the disease. In fact, we consider the acute convalescent carrier to be the chief cause in perpetuating the disease in India; and in this respect the epidemiological aspect of paratyphoid differs in degree from that of enterica, for in the latter disease the diagnosis is seldom mistaken, the man is isolated, and never returns to his corps till certified free from infection.

EFFECTS OF SANITARY EFFORT.

Outbreaks of paratyphoid have occurred among units in which there was a high degree of sanitary discipline (lines clean and well cared for, with latrines and urinals free from flies). Some medical officers are of opinion that the remarkable fall in the incidence of enterica that has taken place in India during recent years is largely due to the introduction into the British lines of the wet system of conservancy (saponified cresol). Where this system is properly carried out, the latrines and urinals are certainly free from flies and the trenching grounds no longer act as huge fly nurseries. Notwithstanding this satisfactory state of affairs, outbreaks of paratyphoid fever continue to occur. The incidence of enterica, which is becoming less and less each year, points to some condition or conditions at work which have a cumulative effect; we believe that these factors, in order of dominancy, are :—

(1) Segregation of the convalescent enteric patient, until he is proved to be free from infection.

(2) The elimination of the chronic carrier.

(3) Inoculation.

(4) General all-round improvement by attention to sanitary details.

The risk of the soldier contracting the disease is much greater in a large station than in a small one, owing to the constant fluctuations of the military population in the former; these fluctuations being due to athletic gatherings, rifle meetings, courses of instruction, and polo tournaments which are held in the larger stations and attract considerable numbers of men from other smaller cantonments.

Just as this paper was completed, we received the May number of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, containing

Major McNaught's article on paratyphoid fever in South Africa. His description of the clinical symptoms agrees closely with our own experience, so much so that it is difficult to withhold the conclusion that the paratyphoid fever of South Africa is the same as the paratyphoid fever of India. He states that the *B. paratyphosus* B is usually found in these South African cases. We confess that we do not understand the situation, as in all our experience in India we have not yet met with a case from which we have been able to isolate the B variety of this micro-organism. It is obvious that the whole question of the identity of the causative organism in these cases needs critical inquiry. It may be that workers who find the bacillus B in paratyphoid fever are not applying sufficiently accurate methods for differentiation and are relying too much on serum reactions. To discuss the fallacies underlying the serum reactions would make this paper too long, but we would remark that the apparent anomaly between our Indian experiences and those of observers in South Africa is a matter which we, in the Corps, might well attempt to elucidate.

When compiling this paper we have made full use of the records at the Naini Tal Enteric Fever Convalescent Depot, and of the observations of Major D. Harvey, R.A.M.C., for which we are greatly indebted. Our thanks are due to Major Blackwell, of the Corps, for numerous blood cultures, charts, and clinical observations; we are also indebted to the Divisional Sanitary Officers, for their trouble in collecting information for us, while to Captain Gregg, R.A.M.C., we owe much for kindly help in the laboratory.

SUMMARY.

We are of opinion that a considerable proportion, probably a third, of the cases returned in India as pyrexia of uncertain origin are in reality cases of paratyphoid fever due to infection by the *B. paratyphosus* A. What this means in extent of prevalence will be apparent when we add that no less than 4,386 cases of pyrexia of uncertain origin occurred among British troops in India in 1909. The highest incidence was during the months of April and May. Under the same heading in 1910, the cases dropped to 2,733.

United Services Medical Society.

WATER SUPPLY IN THE FIELD.

By Major C. F. Wanhill.
Royal Army Medical Corps.

In dealing with the subject of the provision of pure or innocuous water to troops in the field it is necessary to repeat facts which are well known as well as those less known, so that the proper position of new principles and inventions may be made clear. Numbers of officers are instructed, every year, in this College, still it is not uncommon to find that though an officer may have a good knowledge of the principles which deal with the subject, he is not familiar with the limitations of the various methods which have been suggested for carrying out the principles. I hope I may therefore be excused if I seem to remind any of you present of facts with which you are already familiar, since my aim is to mention the particular circumstances in which each method should be adopted. The search for simple and yet effective methods of providing innocuous water is still going on, and the evolution of a method of clarification as opposed to filtration has brought us a great deal nearer our goal. This method I hope to demonstrate in the Square after reading this paper.

Though many authorities are of opinion that the period of existence of *Bacillus typhosus* in water is very short under natural conditions, and that 99 out of a 100 waters, in the country districts, unless obviously polluted with sewage, could be used by troops without bad effect, still it is the 100th water which, by starting an epidemic of enteric fever, diminishes, to a large extent, military efficiency. Some method of water sterilization is therefore essential, whether for large bodies of troops or for single individuals.

The provision of pure water for troops in stationary camps and posts, such as the Base, Advanced Base, Rest Camps, General Hospitals, etc., is comparatively simple, since civilian appliances, capable of supplying harmless water to all, can be, more or less, used. Permanent sterilizing plants can be fitted up, and supervised by men trained for the purpose.

No arrangements which have fixed apparatus are of any use with troops in the field. Any such must be mobile and capable of following the units to which they are attached over practically any sort of country. In determining what form of apparatus shall be adopted we have to consider what method of sterilization will give us the best results and at the same time allow of easy transport.

The size of the apparatus is of first importance. The larger the apparatus the more efficient and economical it is likely to be and the fewer men will be required to look after it. If possible, such an apparatus should be self-propelling and should sterilize water by self-contained power. It would, however, necessitate the provision of water-carts to carry the water to the units, since it would not itself be able to distribute it. If large bodies of men always acted together, this method would possess many advantages, since the unit could establish itself at some central stream and there supply the water-carts with sterile water. Such water would be protected from contamination, as there would be no handling necessary in distribution, the staff would be highly trained, and the water-carts, never taking in dirty water, would not require cleaning, and could be kept locked. It has been ruled, and I think rightly, that such units are inadvisable. Even if the troops supplied by the unit kept together there is a very good chance that, with the roads blocked by the transport supplying the army, either the unit would not reach the position or the carts would not find the unit. The half-battalion water-sterilizing cart has therefore been decided on as the maximum and minimum apparatus advisable. It is as small as is compatible with efficiency, forms a load for two horses on the road, and is reasonably mobile. If further subdivisions of troops are to be provided for, some means allowing for individual sterilization of water must be used.

The desiderata for a small sterilizing unit are as follows :—

(*a*) It must be able to follow the unit to which it belongs anywhere within reason.

(*b*) It must perform the duty of sterilization in such a manner as to remove from the water any matters which are likely to be deleterious to the health of the troops.

(*c*) It must be sufficiently simple in action to enable it to be handled by partially trained men.

(*d*) It must not contain fragile parts which, if broken and not immediately replaceable, will render the machine useless.

(*e*) It must be able to deliver innocuous water at a moment's notice.

These conditions are severe, but represent the ideal of efficiency, and it is owing to the failure of each of the methods of sterilization which we possess, up to the present, in one or other of these particulars that it is impossible to decide on any one method to the exclusion of the others.

The sterilization methods which are available are four, *i.e.*, mechanical filtration, heat sterilization, chemical methods, and the use of the ultra-violet rays.

Commencing with the last it may be said at once that, at present, the method is quite unsuitable for units which would be supplied by the present water-cart. The necessary current cannot be generated in an economical manner, while, taking it from the telegraph battalions is hardly likely to be welcomed by the latter. The apparatus is fragile, requires very skilled supervision, and will not work with muddy water. A cart to which this apparatus is fixed has been designed in Germany and is described in the *Corps Journal* of May last. The weight of the installation, without the water in the cart and without a generating plant, is, I believe, two tons. This alone removes this form of cart from the region of practical politics.

The use of chemicals might seem to promise a way out of the difficulty, but, though they are efficient in small bulks of water, they fail when used with large quantities. The reason for this is that with appliances suitable for work in the field thorough mixture is impossible, and one cannot ensure that every portion of the water comes in contact with the disinfectant for the requisite period of time.

It must also be remembered that the water served out to the troops will contain a quantity of a salt which, though harmless if only taken for a short time, might produce unpleasant effects after prolonged use.

Sterilization by heat has many advantages and disadvantages which I have tried to set out in the following table, in which the various methods are contrasted.

Each of the four methods of water sterilization has its particular applicability, and under certain circumstances would be preferred. Thus, for example, for a hospital on the lines of communication which would almost certainly have electric light installed and which received, at any rate, clarified water, the ultra-violet rays would probably be the most suitable, since they are able to work automatically with very little attention. When they do require attention, however, it must be that of an expert electrician.

For such camps as rest camps, through which troops are constantly passing, and which never have a sufficient permanent staff to keep the camp in proper order and to provide water for the

Mechanical sterilization	Heat sterilization	Chemical sterilization (not available for large bodies of men at present, but eminently suitable for detached parties)
(*a*) The official cart can follow wherever wheeled transport is at all possible. Where wheeled transport cannot go there are patterns of the clarifier filters for carriage by mules or coolies.	(*a*) A cart has been devised which could follow the troops; but it is still in the experimental stage. To be efficient the apparatus must be on a much larger scale than the exigencies of military service will allow. (See Notter and Firth, p. 930)	(*a*) Chemicals are, on account of their small bulk and weight, easily portable.
(*b*) The old pattern filter water cart does not sterilize the water; at best, it removes a percentage of organisms only. The candles require periodic boiling, since it is possible for organisms to grow through the medium. The candles are thus put out of action, the joints cracking owing to the different expansion of the metal and porcelain.	(*b*) There is no doubt about the sterilizing powers of the heat exchangers. When in good order they sterilize the water without fail.	(*b*) Chemicals are fairly certain in their action in small bulks of water, but not in large, without bulky mechanical contrivances. (Water thus treated cannot be used continually.)
(*c*) The filter water cart is very simple in action and is easily worked. Very little training is required to deliver the water, though considerable knowledge and care is necessary to prevent it being contaminated after filtration.	(*c*) The heat exchangers are automatic in action so long as they are in order, but are very easily damaged in transport.	(*c*) Chemicals need only to be added and well mixed.
(*d*) The candles are very fragile and easily broken. Without them the cart, as a filtering unit, is useless. The pumps are also apt to get out of order. India rubber is largely used to make joints. This, in a hot country, is a great drawback.	(*d*) The whole apparatus is very fragile and the heat exchanger is frequently found broken. The capsule is delicate, and the burners, if lamps are used, also soon wear out.	(*d*) Chemicals are only destroyed by exposure to water, and by age.
(*e*) The filter cart is ready to deliver water as soon as the pumps are worked. As long as the raw water is clear the delivery is reasonably good, but the presence of suspended matter in the water very soon puts the filters out of action.	(*e*) The heat exchanger can deliver water at about the same rate as the cart, but requires half an hour before delivery commences. This time is required to fill the exchanger. Mud rapidly blocks the apparatus and puts it out of action.	(*e*) Chemicals require an appreciable time to act. The longer the time available the less the amount of the reagent required. If the reagent has to be used in large quantities, the water being required for immediate consumption, the taste is apt to be nauseous.

General.—Both forms are cumbersome and add greatly to the weight of the water carts. If the idea of the Brigade Sterilizer could be carried out, this would undoubtedly be useful, as the water carts would carry water only and would want no other attendants than the driver, while the skilled personnel could be concentrated at the sterilizing point.

incoming troops, the heat exchange installations might be the best. They will work as long as the supply of fuel, which can be of a simple character, is kept up, and require little attention. After a very slight training in mechanics, with a few tools, the man in charge could repair any ordinary defects.

The principle of mechanical filtration has been adopted for troops in the field, but till lately the mud in the water has always been the drawback. I remember the filters being returned into store or merely carried about in Egypt and in South Africa, because it was impossible to filter the water on account of excess of mud. Used with water such as is supplied at one's own house the filters give a fairly good output, but the presence of the smallest amount of mud blocks them in a short time. Again, too, the degree of efficiency of a filtering material in preventing the passage of micro-organisms depends on the opposition offered to the passage of the water. In other words the finer the pores of the medium the more organisms are kept back but the smaller is the delivery of water, while if we have a medium which gives a satisfactory water delivery, we cannot expect more than a partial removal of organisms.

With this we have to be content since a sufficient flow of water is an absolute necessity for military purposes. Compromise is therefore the order of the day. There has, however, been worked out at the School of Military Sanitation, Aldershot, and the Royal Army Medical College, a method which, while removing the mud from the water, utilizes it to remove the micro-organisms as well. In fact the sand filter is imitated, the so-called zooglea layer being supported on flannelette instead of sand. By this means, with Thames water, it has been found that from 60 to 80 per cent. of the organisms present in the water can be removed, while the delivery of perfectly clear water is very rapid. If absolute sterility is desired, it is only necessary to pass this clarified water through the existing candles to obtain it. It has been found possible to clarify water from a village duck pond by this method, though it must be remembered that coloration of water cannot be removed, since the colouring matter is in solution and not in suspension.

Were it not that it is impossible to deal with a specifically polluted clear water, which must be of very rare occurrence, by the clarifiers owing to the absence of mud, goodbye might be said to the filter candles as being expensive, heavy, fragile and generally unsatisfactory. Using the official water-cart it has been possible to sterilize both clear and Thames water with the clarifiers alone in combination with small quantities of bleaching powder. This method, however, is still in the experimental stage.

Coming now to the water supply of a number of troops smaller than half a battalion which are not in possession of a water-cart. These are the very people to whom we want to give the greatest attention, since they are more likely to come across streams of which the Medical Officer has no knowledge, and hence to run more chance of getting bad water. It is, therefore, very necessary for them to thoroughly understand what measures they should take under these circumstances. Below the half battalion there is no arrangement made for any system of collective water sterilization, so that the methods adopted must be applicable to single persons as well as to a number. The methods which are to hand are boiling, chemical sterilization and individual filtration.

The latter is impossible, since not only are the small filters unsatisfactory, but they add to the weight the soldier has to carry and to the work he has to perform.

The boiling of water can be carried out by individuals in their canteens, the water being either left to cool all night with the lid on or poured straight into the water-bottles as water or as tea. It is not generally known that such a bottle on a cold wet night acts as a hot-water bottle and considerably increases the comfort of the possessor, besides providing him with pure water for the day following. In small units it is possible for the cooks to put a kettle of water on the fire which remains when their work is done and to leave it there all night. This will either boil the water or will raise it to a sufficient temperature to destroy disease-producing organisms, while in the morning it will be cool enough to put into the water-bottles.

If fuel is not available, as in South Africa, or when, for tactical reasons, it is inadvisable to light a fire, then chemical methods might be of use. Of these there are several which are efficient, the two best being the iodine method of Vaillard, several times reborn under other names, and the acid sulphate of soda tablets of Parkes and Rideal. The latter, as modified by Colonel Firth, are the most practical. To sterilize the water in the water-bottle one tablet is dropped in, and after half an hour the water will be found to contain no organisms of the colon-typhoid group, even if they have been previously added. The addition of saccharine and oil of lemon to the tablets makes the water taste like weak lemonade, and the men usually like it.

The iodine process requires the use of three tablets, and is hence not advisable.

In preparation for the prolonged fights of the present day it would be possible to issue to each man say seven tablets. One of these he would drop into his water bottle every time he filled it, which should not be oftener than once a day, and he would thus be able to sterilize his drinking water for seven days. Longer than this he should not require to go, for the battle would have been decided one way or the other before that, or the water carts would have reached him. What the result of such prolonged use of this acid water would be it is difficult to say, but I personally would sooner risk the effects of a dose of weak sulphuric acid than of *B. typhosus*. If issued in glass bottles there is a danger of the clothes being burnt as the bottles may be smashed, and any water getting to the tablets liberates the acid. This might be got over by using vulcanite or aluminium containers holding say seven tablets, the latter to be removed as required.

Whatever method we may decide to adopt, there is a necessity for strict water discipline to ensure that, after the water has been sterilized, it is not again contaminated by careless persons. Where collective schemes are adopted, such as, for instance, boiling in camp kettles, careful organization is required to see that the water is not fouled when the bottles are filled. The dipping of bottles with a dirty felt covering in the kettle will undo any good done by boiling. It is not sufficient to merely say boil and leave it there, the whole position must be thought out and strict rules issued. Actions which have very little significance in themselves have a very serious one from a sanitary point of view. Thus the giving of a drink to a comrade, to the lay mind a praiseworthy piece of generosity, to us is an indication of horrible danger should that comrade's bill of health not be clean. The contamination of water after sterilization is far more fraught with danger than when raw water is used, since the contamination is likely to be with some of the parasitic organisms of disease harboured by man placed in water from which all competing organisms, which in the raw water would have soon got rid of the parasites, have been removed, and which is intended to be drunk in a short time.

The training of each individual in the proper care of water therefore ranks with, if not before, that of the purification of water since, if the former were properly carried out there would be little need of the latter. One must be taken with the other, and the sterilization of water should only be regarded as an absolute necessity in the few cases where water discipline has failed to protect the water supply.

DISCUSSION.

Major W. S. **Harrison**, R.A.M.C., asked whether the designers of the new cart had finally abandoned the position that it was possible to provide germ-free water for troops in the field, and whether they contented themselves with straining it. He noticed that with the best results there were still 20 per cent to 40 per cent of the original germs present after passing through the clarifier, and with specifically contaminated water it appeared that the water passing over would still be potentially infective. The author had said that one could remove the remainder of the germs by passing through candles, but then in another part of the paper he had condemned candles for field service work.

Colonel **Ryan**, Australian Medical Corps, said it was new to him that it was possible to provide water sterilized by mechanical means to troops in the field. In Australia, where troops would have to depend largely on the dirty water in dams, such an arrangement as Major Wanhill had described ought to be very useful.

Colonel Sir **David Bruce** said that our knowledge of water was constantly changing; we knew now that typhoid bacilli had a very short life in water, and he would fancy that the water in the dams of Australia would very rarely contain typhoid bacilli. At one time we thought that we had solved the problem of water supply in the field by the use of candle filters, but they were very fragile and their yield was very poor if they were really effective as sterilizers. In Ladysmith they managed to get water through candles by clarifying it beforehand, passing it through sand or ashes. Selous had told him that he personally always carried a "billy," and when he wanted a drink he made tea.

Major **Wanhill**, in reply, said there were two schools; one thought that all water was dangerous without sterilization, the other thought that water was only dangerous when it had been recently specifically contaminated. It was necessary to compromise in the matter; it was impossible to provide troops in the field with sufficient sterile water for their use, and it was doubtful if it was, except under special circumstances, necessary that one should do so, but no one questioned the desirability of providing troops with clean water; the clarifier would do that, and if it was necessary one could further pass the water through candles. Candle filters working with Thames water were choked in five minutes, and the purification of what water did pass through only amounted, with the porous candles they used, to 30 per cent reduction in germs. But if the water was first passed through the clarifier there was no choking, and clarified water passed through the filters came out sterile. The yield of the clarifiers was 120 gallons in twenty minutes, if the water passed through the filters also the yield was 120 gallons in an hour.

Clinical and other Notes.

EARLY ESTABLISHMENT OF COLLATERAL CIRCULATION AFTER LIGATURE OF THE EXTERNAL ILIAC ARTERY.

By Captain S. R. GODKIN.
Indian Medical Service.

Sepoy, M. C., aged 31, was admitted to hospital on September 10, 1910, suffering from aneurysm of the left common femoral artery.

He had a pulsating tumour about the size of a hen's egg in Scarpa's triangle, 1 in. below the fold of the groin.

On September 15, 1910, the left external iliac artery was tied.

An incision 2 in. long was made parallel with and ½ in. above Poupart's ligament, which was pushed up, and the artery tied with a double silk ligature, ¾ in. above its level. The wound was closed layer by layer, with catgut sutures. Poupart's ligament was stitched to the fascia lata of the thigh. The whole limb was wrapped in cotton wool, lightly bandaged over the wool, and then wrapped round with a blanket.

Patient was allowed to sit up in bed three days after the operation. On the eighth day a feeble pulse could be felt in the posterior tibial artery at the ankle. On the tenth day the stitches were removed from the skin: the wound was quite healed and the pulse was more perceptible in the posterior tibial artery. On the twelfth day the patient was allowed to walk. Eighteen days after the operation, the patient was walking about, and cooking his own food. He still complained of slight pain in the knee-joint.

On October 12, 1910 (twenty-eight days after the operation), he proceeded on three months' sick leave. He then had no pain in the thigh or knee.

The point of interest about this case is the rapidity with which the collateral circulation became established, in a part where the anastomosis is by capillaries only.

FRACTURE-DISLOCATION OF THE SPINE WITHOUT PARALYSIS

By Captain S. R. GODKIN.
Indian Medical Service.

Sepoy, D., aged 28, was admitted to hospital on September 2, 1910, suffering from fracture of the spine caused by a wall falling on him.

There was a marked angular curvature of the spine at the level of the twelfth dorsal vertebra. There appeared to be at least 1 in. displacemen of the lower part of the vertebral column backwards on the upper part. He was in great agony with pain in the body at and below the level of the fracture.

He had no paralysis of motion or sensation. He was given morphia for the pain, and kept in whatever position afforded him most ease. At first he lay on one or other side. He passed urine normally. During the day a large semi-fluctuating swelling developed on either side of the fracture.

September 5, 1910. Bowels have been constipated. The swelling of the back is somewhat less. He can now lie on his back. He is encouraged to do so. The curvature is slightly less than it was at first.

September 6, 1910. Considerable wasting of the muscles of the pelvis and thighs was noticed to-day.

September 10, 1910. Patient can now sit up in bed, by pulling on a rope from the ceiling with his hands. The curvature of the spine has been steadily diminishing since the third day after the accident.

September 16, 1910. Pain in abdomen and loins still present, especially on turning movements of the trunk.

September 23, 1910. Curvature now consists of a slight prominence of the twelfth dorsal, first and second lumbar spinous processes. Patient started to walk to-day, with the aid of a stick in each hand. Muscles of the pelvis and thighs have recovered their normal size.

October 2, 1910. Walked a couple of steps without sticks. Can walk comfortably with a stick in each hand. He still has pain on turning movements of the trunk.

October 18, 1910. Patient to-day proceeds on six months' leave.

The remarkable features of this case are (1) Amount of displacement at the site of fracture, without any paralysis; (2) The practically complete reduction of the fracture by postural treatment only. No active measures were taken to reduce the fracture.

NOTES ON A CASE OF SYPHILIS TREATED WITH "606."

By Captain J. A. TURNBULL.
Royal Army Medical Corps.

I have read of so many cases of syphilis treated successfully with "606" that I thought the following case might be of interest, as the "606" on both occasions evidently became encapsulated and syphilitic eye symptoms developed.

Private Y. was admitted into hospital on September 5, 1910, with the following symptoms of syphilis. Some pharyngitis; roseolar rash over body; glands shotty; hair falling; several mucous patches on lips and tongue.

He had contracted the sore about July 20, 1910. He received two injections of mercurial cream (1 gr. each). On September 19, 1910, he was given 0·4 grm. "606." Ten days later there was no rash or pharyngitis, but the hair was still falling. He was discharged hospital on October 7, 1910. Three weeks later he was readmitted into hospital, with a large painful swelling at the site of injection—interscapular region, right side. There were no signs of suppuration. He was discharged hospital after three weeks, his condition being much improved. After thirty-seven days he was readmitted into hospital suffering from severe general conjunctivitis in both eyes with ciliary injection; some general irido-choroiditis.

On examination, the "606" was found to be encapsulated and practically none of it absorbed. A consultation was held with Dr. McKenzie, Glasgow, and it was decided that the eye symptoms were due to syphilis, and that the arsenic had remained practically in situ.

On December 15, 1910, he was therefore given another injection of 0·45 grm. "606." On December 25, 1910, the conjunctivitis was much improved, only slight iritis, and dimness of vision due to opacities in vitreous being present. On January 5, 1911, there was still some iritis. On January 25, 1911, he was discharged hospital. Twenty days later he developed a large fluctuating swelling at the site of the injection, viz., the right buttock. The swelling showed no signs of suppurating, and had a well-defined margin. It is most probable that this injection was also encapsulated.

From this date his eye-sight has gradually become worse, and is now as follows:—

Left eye: Vision—Hand movement.

Large vitreous opacity, with fine dust-like opacities: only a glimpse of the fundus obtainable.

Right eye: Vision $\frac{6}{60}$. Vitreous opacity not so large as in left eye.

Some of the subjective symptoms of retinal detachment, but no detachment can be seen. There are dots on the lens.

In this case it would appear that the two injections have become encapsulated, and that the "606" has not affected the case at all.

SOME FURTHER OBSERVATIONS ON SALVARSAN OR "606"

By Lieutenant-Colonel F. GORDON-HALL, and Lieutenant P. TAYLOR.
Royal Army Medical Corps.

The following table shows the results of the Wassermann reaction in seven cases treated by mercurial injection in the usual way and six others treated by intra-muscular injections of salvarsan. The cases were taken indiscriminately as they came in.

(*a*) TREATED WITH MERCURY.

Name	Treatment	Result of Wassermann reaction
Pte. R. ..	Completed third course of mercury ..	Positive on March 2, 1911.
,, A. ..	,, ,, injection of third course of mercury	,, ,, ,, ,,
,, S. ..	,, fifth injection of second course of mercury	,, ,, ,, ,,
,, U. ..	On fourth course of injections of mercury	Positive (slight) March 2, 1911.
,, McP.	Completed third injection of fourth course of mercury	,, ,, ,, ,,
,, H. ..	Had had seven injections of mercury ..	Positive, March 2, 1911.
,, W...	Completed second course of mercury ..	Negative, March 2, 1911.

(*b*) TREATED WITH SALVARSAN ("606").

Name	Treatment	Result of Wassermann reaction
Pte. C. ..	One injection 0·3 grm. Salvarsan, September 9, 1910	Positive (slight), March 2, 1911.
,, S. ..	,, ,, 0·45 ,, Salvarsan, December 7, 1910	Negative, March 2, 1911.
,, H...	,, 0·45 ,, Salvarsan, December 7, 1910	,, ,, ,,
,, T. ..	,, ,, 0·45 ,, Salvarsan, December 15, 1910	,, ,, ,,
,, D. ..	,, ,, 0·45 ,, Salvarsan, December 15, 1910	,, ,, ,,
,, H...	,, ,, 0·45 ,, Salvarsan, December 15, 1910	Positive, March 2, 1911.

Results of the intravenous injections of salvarsan, in a few cases:—

Only one injection of 0·4 grm. was given to each man and Ehrlich's method was but slightly modified.

Private H.:—Had received 8 injections of mercury but still had severe iritis. Five days after the injection of salvarsan the iritis had gone and there were no other symptoms. Has kept well now for some months.

Private C.:—Had received 9 injections of his first course of mercury, but still had severe ulceration of the tonsils. Six days after injection of salvarsan, the throat symptoms had gone, ulcers were quite healed and there have been no symptoms since (now almost three months).

Private G.:—Had not had any mercury. Roseolar rash, shotty glands and pharyngitis present. Sore on penis also not healed. Twelve days after the injection all symptoms had gone except that the sore on penis had not quite healed, ten days later the sore also had healed. He still keeps quite well; three months after injection.

Private S.:—Finished his second course of mercury. No symptoms, but looked pale and was losing weight. After the injection he put on 14 lb. in a month, and now (two and a half months after) looks very well.

Private S.:—Had received six injections of his second course of mercury, but a profuse macular rash had again broken out all over the body and he had mucous patches in the mouth; ten days after injection all rash and other symptoms had disappeared, and he is now (between three and four months have elapsed) rapidly putting on weight and keeps quite well.

Private E.:—Contracted syphilis in 1906 and he has practically had mercurial injections ever since. Admitted to hospital with iritis and ulcer of cornea, given an injection of salvarsan on May 4, 1911, the ulcer rapidly healed. The iritis has now disappeared, and he is quite well and gaining weight.

Private S.:—Had completed his second course of mercury. No symptoms except losing hair and weight. Had an injection of salvarsan on May 4, 1911, and has kept very well since. The falling out of his hair has stopped and he is gaining weight.

Lance-Corporal W.:—Ulcers in mouth and on tonsils, slight rash on body. Had an injection of salvarsan on May 21, 1911, and in seven days all symptoms had disappeared. He did not have any mercury.

One patient who had had an intramuscular injection of 0·45 grm. of salvarsan and in whom all symptoms vanished very quickly, came to hospital about four months afterwards with symptoms of neuritis, followed by paresis of both legs, and also suffering from deafness. He had suffered from disease of the middle ear some years before and had always been somewhat deaf, but had become markedly so. His blood gave a negative Wassermann on March 2, 1911, about three months after the injection. He is now rapidly improving under the usual treatment with phosphorus, strychnine, iron tonics and galvanism.

We have again to thank Dr. Ivy McKenzie for his help in this matter.

A THIRD REPORT ON SPINAL ANALGESIA.

By Major J. W. H. HOUGHTON.
Royal Army Medical Corps.

Having recently used the method of spinal analgesia in a further series of 100 cases, at the Cambridge Hospital, Aldershot, a short note on the results obtained may be of interest to those employing this method.

The operations were for the following conditions:—Appendix, abscess of, 4; Removal of Appendix, 4; Herniæ, 35; Hæmorrhoids, 7; Removal of Semilunar Cartilage, 9; Varicocele, 5; Hydrocele, 3; Varicose Veins, 4; Circumcision, 3; Anal fistulæ, 4; Necrosis of bone, 5; Removal of cyst, 1; Fractures of Femur, 1; Fracture of Tibia and Fibula, 2; Fracture of Patella, 4; Osteotomy, 3; Amputation through Femur, 2; Herniæ of Muscle, 1; Resection of Intestines, 2; Loose body in Knee joint, 1; Removal of Testis in Cryptorchid, 1; total, 100.

The same technique was employed as in the series previously reported. Stovain was the analgesic used in 91 of these cases and novocaine in 9 cases.

There was no case of failure in entering the dural sac, and in no case did the injected fluid fail to act.

In three cases a second injection was given, as after the first injection the analgesia did not extend high enough for the performance of the operation.

In two cases when novocaine was injected, the analgesia did not last long enough, and the operations were completed under light general anæsthesia. My limited use of novocaine has not created an impression in its favour in comparison with stovain or tropococaine. The dose required is almost double that of stovain, and the analgesic effect does not appear to be so deep or lasting. The bye-effects in these cases were mostly trivial.

During the operation, there was faintness or nausea in 16 cases.

In these 16 cases the analgesia reached to above the nipple line.

In 12 cases the patient vomited on returning to the ward.

Two cases suffered from severe headache, for which a hypnotic was administered. In 45 cases, slight headache was reported to be present on the evening following the operation, but this headache did not interfere with the patient's sleep during the night.

AN ADAPTER FOR UTILIZING JINRICKSHA WHEELS AND SPRINGS FOR THE TRANSPORT OF SICK AND WOUNDED ON STRETCHERS.

By W. R. C. MIDDLETON, M.B., D.P.H.
Surgeon-Major, Singapore Volunteer Corps.

It occurred to me some years ago that the wheels and springs of jinrickshas might be utilized for the transport of wounded on stretchers. The same idea had occurred to Major H. E. Winter, R.A.M.C., to whom I mentioned it when he was stationed in Singapore, but I am not aware that he ever put it into practical form.

The carrying out of the idea is facilitated by the simple way in which the body of the jinricksha, with the shafts, is attached to the springs. This is done by means of a couple of bolts on either side which pass through corresponding holes on the upper portion of the springs, and are secured by nuts. By unscrewing four nuts therefore the body and shafts can be dismounted leaving the wheels, axle, and springs.

The present contrivance is one which, on the invitation of Lieutenant-Colonel Barratt, R.A.M.C., I had an opportunity of showing in a rather crude and unfinished form before Major-General Stephenson and officers

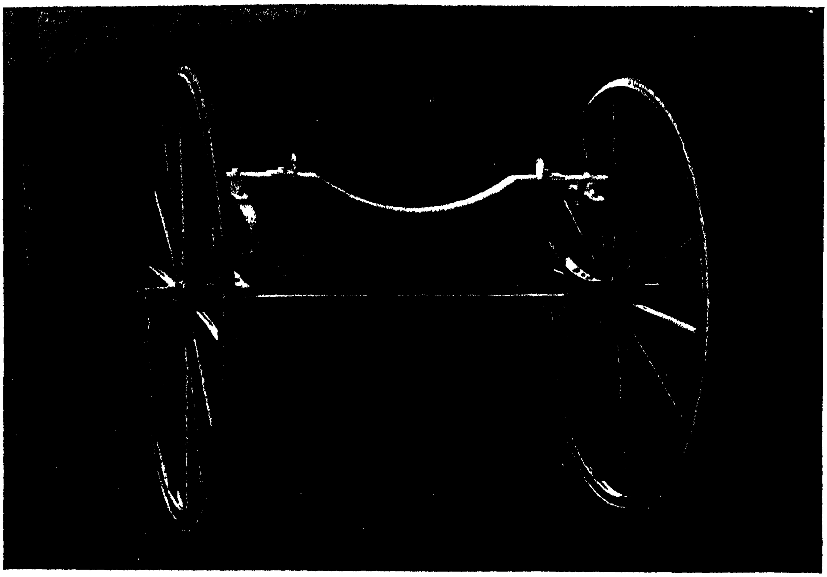


FIG. 1.—Wheels, axle and springs with adapter in position.

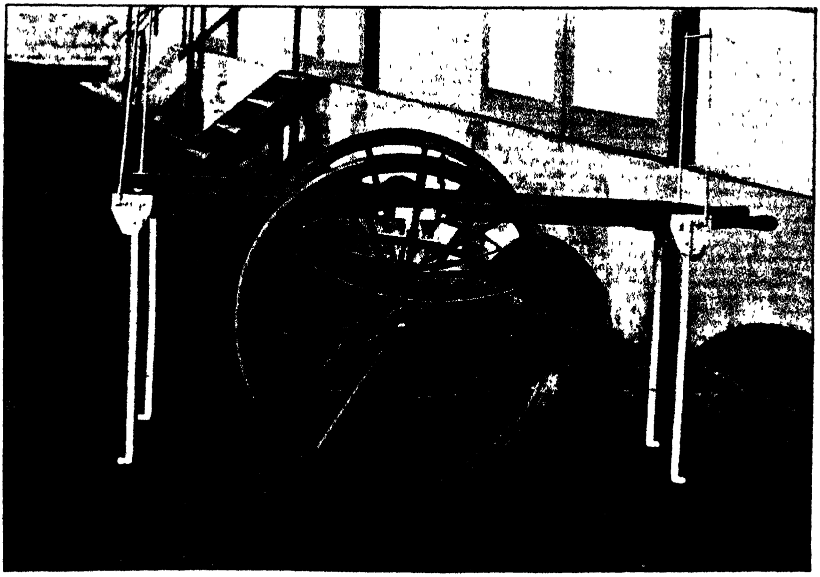


FIG. 2.—Stretcher on adapter with supports for awning in position.

of the garrison in February last. It consists of a steel bar 2 in. wide and ⅛ in. thick, stretching from spring to spring, and bent downwards in its centre portion to avoid contact with the canvas of the stretcher. It is attached to the springs by bolts passing through the same holes as the bolts of the jinricksha body and secured in position by nuts. As the width between springs and the distance between the holes in the springs vary within certain limits, the bar and the cross piece attaching it to the springs have to be made adjustable. To receive the stretcher two adjustable uprights are provided which fit into brackets screwed on the sides of the stretcher poles. Other additions to the stretcher are (1) four legs to preserve it in a horizontal position when stationary, and which when not in use are folded up along the poles, (2) four sockets for receiving uprights for the awning. These are both attached to an irregularly triangular metal plate screwed to the stretcher pole above and attached to the rackets below by a prolongation of the axles of the rollers. This plate also bears a socket into which the legs slide when in use, and which serves to support them against lateral strains.

The awning is made in one piece with side and end flaps, and is supported by two metal uprights, and a cross piece at either end. These pieces are 23 in. long (equal to the width of the stretcher). When not in use they are placed in pockets at either end of the awning, the side and end flaps folded in and the whole rolled up and fastened with straps.

The accompanying photographs will give an idea of the contrivance.

The weight of the adapter is 7 lb., of the awning and supports 10 lb., and of the other additions to the stretcher 20 lb., adding 30 lb. to the weight of the stretcher, but it would doubtless be possible to reduce this weight by the use of lighter materials without a sacrifice of strength. The cost of providing a litter of the above description (exclusive of the stretcher) was $75 (£8 15s.). This included rubber-tyred wheels, springs, axle, hood, metal fittings and painting.

A small screw spanner should also be included with each stretcher, and all the metal portions should be galvanized or painted with aluminium paint to prevent rusting.

In emergencies jinrickshas and coolies accustomed to pulling them could be commandeered, and by the use of the adapter the jinrickshas could be easily and quickly converted into wheel litters. Where it is desired to have such litters always at hand, wheels, axles, and springs can be purchased and wheel litters provided at a cost considerably less than that usually charged for the different designs now manufactured.

LATRINE INFECTION—SUGGESTED REMEDIES.

By Serjeant W. A. MUIRHEAD.
Royal Army Medical Corps.

There is abundant experimental and epidemiological evidence to show that latrine infection plays an important part in the causation of enteric fever, especially amongst troops under canvas. The infection may be carried from latrine to camp in many ways; possibly flies, clothing and boots are the most important.

However well the conservancy of units is looked after in the day time, it practically breaks down at night. Lights in latrines are not allowed on service, or on manœuvres, and men will not venture far through fear of stepping into a trench, consequently they urinate or defecate anywhere inside the latrine screen. In this way numbers of men using the latrines get the filth on their clothing or boots, and, on return to their tents or bivouacs will soil blankets and waterproof sheets of other occupants. These soiled articles are collected in the morning, packed into wagons, and redistributed at night, thus they pass through a number of hands every twenty-four hours.

The suggested remedy is that of marking the trenches at dusk by placing at each corner of a trench a white-washed peg or small stone, for on the darkest night a white-washed object is discernible. A small quantity of lime could be carried by units for the purpose, and the work be done by the regimental sanitary detachment.

" In India and most of our foreign garrisons water carriage of sewage is practically unknown, the dry earth system being almost universal.

"The considerable incidence of enteric fever in garrisons where this conservancy method is in force has caused doubts to arise among experienced medical officers whether the dry earth midden or pail, however successful at home and in a moist climate, is altogether an unmixed blessing in hot and dry climates.

"The first difficulty arises with the soldier himself; he often fails to cover his excreta completely with earth, this means the inevitable dissemination of this objectionable matter by flies back to man and his food. The next difficulty arises from careless handling, removal and disposal of the material by the scavengers deputed to perform the work."

The foregoing extract from "The Theory and Practice of Hygiene" (Notter and Firth) applies equally well to standing camps where the dry earth or pail system is in use.

The part played by the fly suggests a remedy, namely, making the latrine fly-proof as far as possible, and reducing the risk of spilling the contents of the latrine pail during removal.

The difficulty of making a latrine fly-proof seems to be with the cover, men will not shut it after use. Many devices have been tried to remedy this defect, they usually take the form of a stop on the cover or lid which prevents the cover being raised to the perpendicular and requires it to be supported by the back of the occupier. This is irritating to the user of the latrine and results in the covers being wrenched off or the stop removed.

With these facts in mind the writer has devised an automatic seat cover which can be adapted to an existing latrine at a small cost. The invention consists of a foot-rest operating two uprights behind the cover, the uprights are bent over at the top and so arranged that the cover cannot be raised to the perpendicular unless a weight is placed on the foot-rest. When the foot-rest is pressed down, the uprights at the back are raised automatically, the cover can then be raised just beyond the perpendicular and made to rest against the uprights, but the moment the foot-rest is unoccupied the uprights drop to their normal position and the wedge-shaped bends return the cover past the perpendicular and close the latrine.

The risk of spilling the contents of the latrine pail is reduced to a minimum by having the pail fitting into a socket on a movable pedestal or platform. When the pail requires emptying it is withdrawn with the pedestal. Guiders are placed on the floor of the latrine interior to ensure the pail being in its proper position when replaced with the pedestal.

The accompanying photographs are taken from a latrine fitted as described.

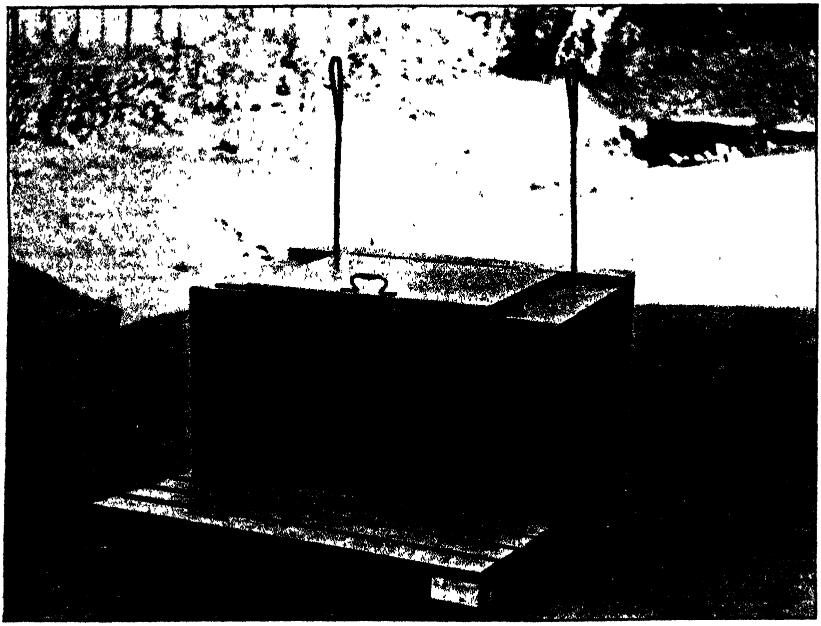


FIG. 1.

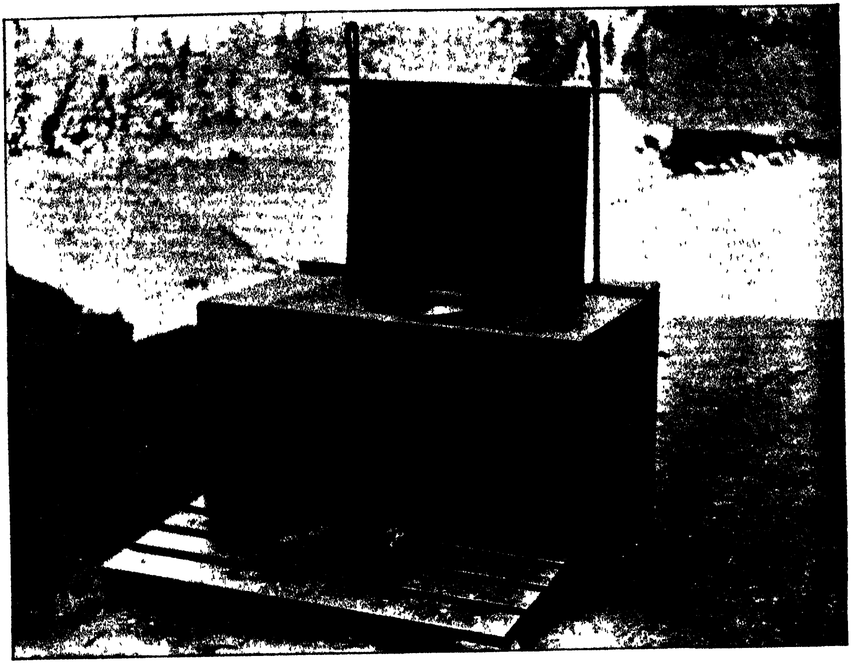


Fig. 2.

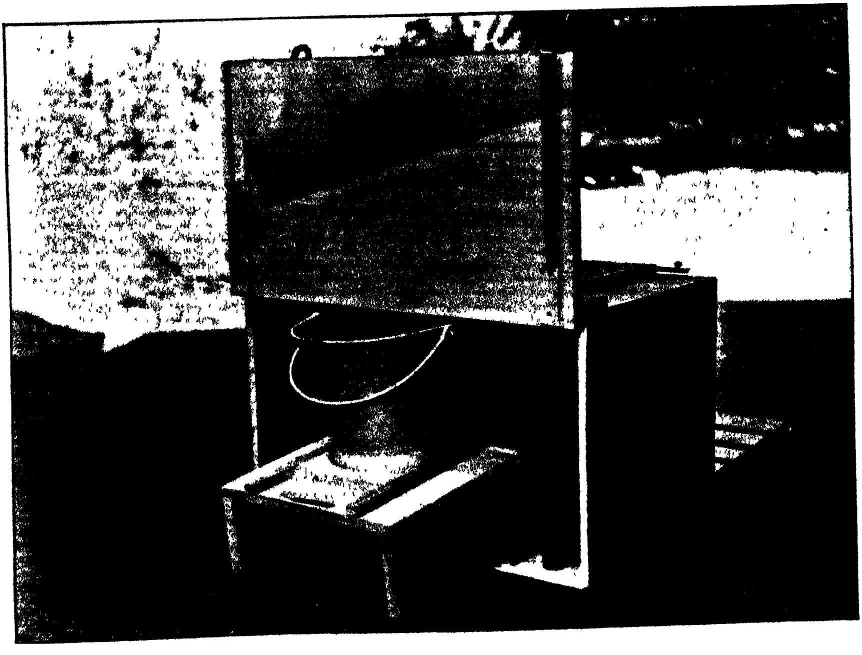


Fig. 3.

No. 1 shows the latrine closed.

No. 2 shows the latrine open with foot-rest occupied; it will be seen that the cover rests against the uprights just below the bends.

No. 3 is a back view of the latrine showing the interior.

The advantages claimed for this latrine are:—

1. The cover is automatic in action.
2. The latrine pail is rendered fly proof.
3. Catches are unnecessary.
4. The removal of the pail is not interfered with.
5. The risk of spilling contents of the pail during removal from the interior is reduced to a minimum.

CASE OF EUCALYPTUS POISONING.

By Major C. T. SAMMAN.
Royal Army Medical Corps.

L. P., aged 25, service six years, was brought to the Station Hospital, Mhow, on the morning of Monday, March 27, unconscious.

History.—Patient was a member of the regimental football team, and had been engaged in three strenuous Cup matches during the previous week. The final was played on Saturday, March 25, and on Monday the team were given a European morning, so no notice was taken when at 7 o'clock the patient was still asleep, more especially as he had the reputation of being hard to rouse in the morning; when at 9 o'clock he was still in the same condition the orderly serjeant became alarmed and ordered his removal to hospital.

On admission, patient was apparently in a sound sleep from which he could not be roused; his temperature was normal, pulse 60, full and steady; breathing normal; his eyeballs were rolled upwards, and it was difficult to see his pupils, but when seen they were observed to be slightly dilated, though they reacted to light; his other reflexes were normal. No other information could be obtained about him, except that he was a teetotaller. It was decided to keep him quiet without any food or drugs, but to have him very carefully watched.

4 p.m.—For a very short time he became restless and groaned a little, but relapsed into his former condition.

A sister was put on night duty to watch for any change that might take place, but there was no change till 8 o'clock next morning when he awoke quite naturally, complaining of a slight pain in his head.

On being questioned he stated that on Sunday, March 26, he had a cold, and hearing that oil of eucalyptus was a good thing for it, he purchased an ounce bottle in the bazaar. The label bore the following directions: "For influenza, asthma, and all bronchial affections. Dose, one to three drops on sugar, or by inhalation." After dinner, about 2 p.m., he took a dose on sugar as directed, but failing to get any appreciable relief by 6 p.m., he then drank three-quarters of the contents of the bottle and immediately became dizzy, but managed to get to bed.

During all this time he had not passed water, or had a motion; two simple enemata and one of castor oil were administered before the desired result was obtained. A catheter was not used as there was no distension, and only 22 oz. of urine were passed after thirty-six hours' interval. He had no more unfavourable symptoms of any kind, and his urine was normal. He was discharged to duty on Friday, March 31.

Travel.

A MEDICAL OFFICER'S NOTES ON THE PERSIAN FRONTIER.[1]

By Captain A. W. HOWLETT, I.M.S.

Colonel Macpherson very kindly invited me to give a brief sketch of such details as may be of interest to medical men, of that remote and little known region from which I have just returned, namely, Robat on the Afghan-Persian-Baluchistan border. I take it that a country is made botanically by its geology and climate, and it is germane to my subject, therefore, to first give a rough-and-ready review of the scenery and topography of the area in question. It is a peculiar beneficence of Providence that in a land so sterile, so much of the scanty flora that does exist should be of utility to mankind. Here the mountain ranges which for the long three and a-half weeks' march from Nushki have been looming in the middle or far distance to left and right, on the one hand marking the Afghan frontier, and on the other that of Mekran, converge and lose themselves in a vast disarray of broken sierras of a barrenness and ruggedness not to be equalled. Passage amongst them is afforded only by deep and often overhung ravines, known by the name of *tungis*, which after many divagations emerge on to the great desert which stretches northward 120 miles to the Helmund, and by occasional flat terrains of a clayey alluvium—locally called *pats*—the vestiges of old lake bottoms long since dried. The most of the vegetation is found in the nullas of the hills and mountains, and on those peculiar formations of cletrites which spread out from the debouchures of nullas into the plains, called *fans*. The desert proper, the long flat plains of sand, the weary leagues of *pat*, the beds of heavy black basalt stones, the ever-shifting dunes with their accurate geometrical configurations, these bear but a niggard and unhappy boskage, as of plants once living but blasted by some fierce volcanic effluvium into dusty skeletons.

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[1] Paper read before a meeting of the Quetta Branch of the British Medical Association, January 25, 1911.

A fortuitous supply of water is obtained from water holes, few of which merit the name of well. A more constant supply for purposes generally of irrigation is obtained from *karezes*. The karez is popularly supposed to have been introduced by the Arabs who at one time settled in the country. The obsolete karezes, found in greater numbers than those in present use, attest the former presence of a larger, or probably more thrifty population. Essentially the karez is a subsoil drain. A favourable *locale* for their construction is in those alluvial fans before mentioned.

We maintain three outposts in this region, which run in a line from east to west, namely, Saindak, Kacha, and Robat. Between the first and last is a march of 100 miles. Camel transport is the only kind available. Water has to be distilled before it is potable by Europeans. The impression I must have conveyed to you of a country monotonous in the extreme (as regards all the cherished amenities of life) is not an injustice. Only at the outpost of Robat is there any diversity of colouring to relieve an eye dulled by gazing on the same eternal monochrome. At Robat the rocks assume brilliant and kaleidoscopic hues; there are veins of vivid green and red, façades of bright yellow, cliffs of polished black with the sheen of anthracite, and steep slopes of blue earth, while amid the litter of loose stones and rubble, topazes, agates and other brilliant pebbles which I am not lapidologist enough to name, arrest the eye at every step. These hues, grotesquely bright in a valley so sombre, along with an enhanced savagery of outline of peak and pinnacle, mark fittingly a site that is the meeting-place of three of the most savage countries left in the world.

With the people of this district we are little concerned, though for the ethnographist seeking after facial indexes, cranial capacities, and other ethnological enchantments, it might be as fine a field as the Tower of Babel. Persians, Afghans, Baluchs and Brahuis meet here and go their ways. But there is little miscegenation; Baluchs and Brahuis they remain. None will admit themselves Brahuis; all like to be Baluchs. The Brahuis are autochthonous, speaking a Dravidian tongue, the Baluchs a later immigration. The Baluchs are fine fighters. It will be remembered that they constituted the greater part of the army of the Amir of Sind at the decisive battle of Miani near Hyderabad. Whichever they be, they agree in having just sufficient intelligence to be suspicious of everyone, and I may here premise that such information that I gathered about them was indirect.

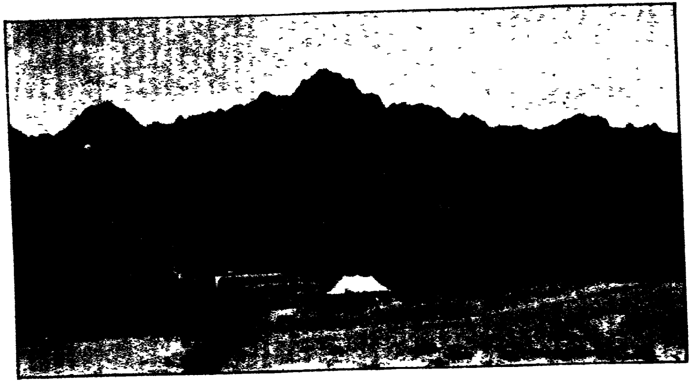
When a camel goes sick no *sohwan* (camel man) seems to concern himself with its cure. He seems to know of no drugs or remedies whatever, though he has lived with, on, for, and by camels since he was born. Your syce who plasters dung on your pony's sore back has, at least, the Æsculapian instinct of most men. But I seriously question if a sohwan could tell you if a camel had one hump or two.

Of all plants the commonest is the tamarisk. It grows gregariously and in some more damp and sheltered nullas attains to the dignity of a tree. Its minute sessile leaves are provided with small punctate depressions which fill with salt, and in virtue of the hygroscopic properties of the latter attract water to themselves from the air. Other plants in the desert have a similar device to counteract constant drought. The plant has some astringent properties and a decoction of it is used to apply to sores and ulcers. In the spring it exudes a kind of resin. These are probably the myrrh trees of which mention is made in Alexander's march. When no other fodder exists camels sometimes crop the higher shoots of the tamarisk.

But the most singular drug growing in these parts is the assafœtida. They call it *hing*. I well remember my first encounter with it. I was returning from a visit to Robat, when in a plain from which the hills receded I came on a covey of chikor. I shot one and followed the rest at a run up some gravelly hills. Small goat tracks covered the hills, and as I ran I was surprised to see beside them small erections of flat stones resembling the trilithons of Stonehenge, but on a Liliputian scale. I took them to be shrines to some fairies or demons supposed to haunt the place. After settling with the chikor (rather more to their satisfaction than mine), I enquired of the tehsildar who was with me concerning these stones. He took me to one and pointed to a bare stump about 3 in. high and an inch or more across, which was sheltered from the sun by the stone above it. From this stump in the springtime exudes the assafœtida resin. It is gathered by Afghans, who come from over the border for that purpose. They trade it to their own country, and to the Punjab, whence it goes all over India. I could not find it had much repute as a drug; it was used chiefly to flavour food. The plant in full growth before it is cut down is like a cabbage. I tried burning a piece in the small mess room to drive out the flies, but from the remarks officers made when they came in I gathered that they preferred the flies. In one or two spots along the line of march are large areas of a thick palmetto scrub, called elsewhere in India *mazri,* here in Baluchistan *pish.* It is put to a great variety of uses, to make coarse cloth, sacks, ropes, &c. The young leaves are made into a decoction to arrest diarrhœa and dysentery, and to stop bleeding.

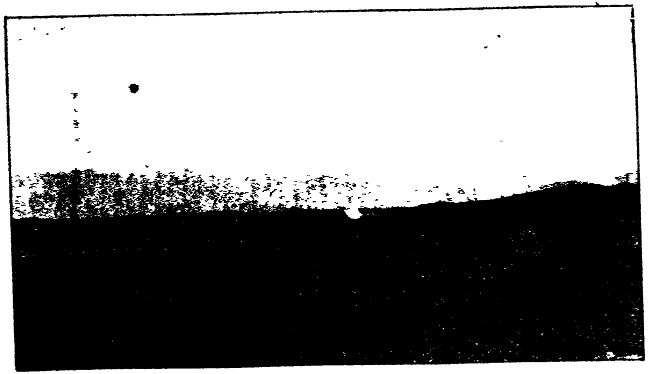
In the nullas about Robat the colocynth grows freely. It is a green procumbent plant, melon-like, with a hard, round fruit the size of a cricket ball. Its medicinal properties are recognized. It is cut into pieces and eaten raw. It also is traded by the Afghans. Asked why he did not give it to his camels, seeing they were so often suffering from want of it, the sohwan replied that he did—when it happened to be about. A suggestion that it would be a good idea to carry some along with him evoked only a grin. Camels were made for men, not men for camels; he would be asked next to carry hot bottles for it.

The willow grows in many nullas, but is seldom more than a bush. It is not used medicinally. They have not heard of salicylic acid, or, if they have, do not see the connection. This, and the tamarisk and a pistachio nut tree, the *gwan*, are all that can pretend to the name of tree. The gwan nuts are gathered and pressed for oil, which is used as a condiment. But the most agreeable of all the plants of medicinal pretensions is the peppermint. It grew scattered in several nullas, but in one, a narrow, high-walled chasm with water coursing at the bottom, I found some beds of astonishing profusion. The air of the whole nulla was redolent of it, and its dark green leaves gathered in big cushiony masses were welcome to the eye as its odour to the nose. On crushing a leaf in the finger it gave forth an aroma so powerful as to create the anæsthetic sensation in the nose given by menthol snuff, if the contradiction of an anæsthetic sensation may be allowed. The tehsildar told me they doubly distil it and put the essence so obtained to a variety of uses. They are fond of it in sweatmeats. About these mint beds there was a striking absence of flies, which elsewhere were swarming. This is in contradiction with the classical authors, who speak of the bees droning over beds of thyme on Mount Hymettus. But Mount Hymettus was no ordinary place. If there is an earthly

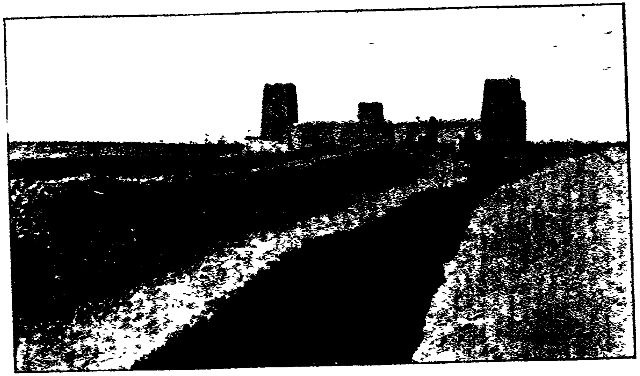


At the foot of the Kacha Koh.

Entrance to the Tangi with irrigated plots, Kacha.



Caravan serai on the Nushki-Seistan Trade Route showing stretch of *vat*.



Serai with karéz (water-channel) in foreground.

kingdom of Beelzebub it is certainly in Baluchistan. In one nulla the camels used to be panic-stricken. The swarms went into ears, eyes, mouth and nose, till they threatened suffocation. The very stones seemed to breed them. *Improbæ muscæ.* In no place have I seen them more "improbæ," both for multitudes and persistence. It is marvellous how we escaped dysentery, diarrhœa, and enteric; but in spite of flies our health remained excellent. I have never had a regiment in cantonments with less sickness, save for the one ubiquitous malady, scurvy. I attribute the good health of the sepoys in circumstances so trying, largely to their open-air existence, in lieu of their usual stuffy quarters. I say, stuffy, for, with whatever ventilation you provide him the native will manage to curtail it as near to nihility as he can.

The method of treating pneumonia is similar to that employed all over the frontier. I heard of it in the Malakand. It consists in killing a sheep and wrapping the patient in its warm skin. For those who may wish to try it I may add that it must be a male sheep. I don't say that a female sheep would make the patient worse, but it wouldn't do any good.

Inoculation is practised for smallpox. An incision is made in the wrist, and smallpox pustule matter is rubbed in. The patient is fed on meat and hot foods until the infection "takes." Gunpowder is used as a medicine—I don't know what for. One disease is much the same as another to the Baluchi, and so long as he has *dewai* of some sort he does not mind. The powder is home-made. A Shikari showed me some coarse unpolished stuff like the scrapings off a graphite pencil. When they want salt the desert folk take up some soil, mix it with water, and decant the water into their food. The soil everywhere is strongly impregnated with salts.

Sanitation is like Archbishop Assher's Snakes in Ireland:—nowhere to be found. Camels and men drink together at the same water hole, while other camels and other men perform natural functions at the same time, and in the same place. With a population of such nomadic habits and so thinly distributed, paucity of conservancy arrangements brings few penalties; but when their habits are imported into more settled places like Robat and other outposts, they are a serious menace to the health of all. It must be obvious, however, that attempts at coercive sanitation would be merely regarded as a form of petty tyranny, and could never be enforced. The only available measure would be to mark off a large area for military occupation, within which no caravans would be allowed.

I must here make mention of a very curious substance that had an extraordinary repute both locally and, I was given to understand, afield in India itself. It was a bitumen which oozed from fissures in the rocks apparently at high elevations. Its appearance was precisely that of coal tar: its smell not dissimilar. The gathering of it entailed both risk and exertion, and it sold for a correspondingly high price. Our sepoys bought up large quantities to carry home, partly for their own use, and partly as a speculation. One man had two kerosine oil tins full. This man, thinking he could not have too much of a good thing, poisoned himself with it, and gave me some trouble. The method of preparing it was to make a watery solution, and mix it with milk. They called it vaguely a tonic, but I think they valued it as an aphrodisiac. One has only to consult the advertisements of Indian papers to understand the immense appeal of such a substance to the Indian mind, that mind which has learnt to focus its very religion on the phenomena of fecundity. At one place on the march I was besieged by men who made very frank demands for "tonic," and my babu told me that on a former mission one of the Nekran chiefs used to send every day for it. "But, sir," he added, "he had seventy-two wives."

I have not touched on the subject of scurvy, a malady from which the sepoys suffered considerably; the ætiology of it, in this particular case especially, is still *sub judice*. The elements usually assigned as factors in its production seemed absent. I am fairly convinced it was not dietetic.

With regard to the natives themselves, who suffer very severely from scurvy in the winter time, the same remark is not relevant; for in them, undoubtedly, a poverty of food-stuffs, particularly vegetable food-stuffs, if it is not the determinant factor, very greatly exaggerates the malady. They are well aware of scurvy as a pathological entity, making use of the English word themselves to designate the disease. They have a great dread of it. In the spring they migrate *en masse* to hills across, or in the line of the Afghan border, where they say are certain herbs growing which are a specific. I believe, whether through the agency of these herbs or not, they do cure themselves, for I only came across one or two old-standing cases on my way out to Robat in the hot weather; whereas, on my return in the cold weather, there was not a sohwan free from it. Many were in a dreadful condition. On one evening, after a bitterly cold march, six of them were brought to me unable to stand. I noticed in them the condition known as "clandication," a symptom usually associated with diabetes and atheroma. What these herbs were I could not discover, nor could I see any dried specimens. I suggested they should gather them and store them for winter use in future, either by drying or some sort of ensilage; but in the ephemeral view of life of the Baluchi such a suggestion is thrown away. I am sure they could not recover to the extent they do in the summer without the intermediary of some medication. It has been remarked by some savant how drugs grow in the countries where the diseases for which they are specific are endemic; on a survey of the Materia Medica many instances will be found.

Of other diseases, plague seems conspicuous by its absence in Baluchistan. The nomadic habits of the people are probably largely responsible for this happy immunity; it is certainly not their cleanliness. Sporadic outbreaks of cholera have occurred. Syphilis is very prevalent, but the evil effects with which it evinces its presence in white communities are mitigated by a sort of long-inherited immunization. A medical curiosity was a case of achondroplasia. He came begging at one of our camps, and they fetched me to see him. He was an adult man, 3 ft. 3 in. high, intelligent, and possessed of all his faculties. But his limbs all showed the typical shortening of the long bones. The fingers, absurdy fat and chubby, radiated like wheel-spokes from the palm. He gave his age as 40, but other people said he was 30. A curious feature of the case was that there were two other dwarfs exactly like himself in the same locality. Some said they were brothers, others denied this. Dwarfs are usually hyper-sensitive and malevolent, but this one seemed rather proud than ashamed of his deformity. It is implied in text-books that the etiology of this disease is unknown; but I fail to see why it should not be taken as a manifestation of congenital luetic taint, it being known that epiphysitis is a frequent accident of that condition.

Naturally, in such a country, eye diseases are common and grave. The constant glare unrelieved by any shade, the wind perpetually blowing, and raising clouds of dust and sand, the multitudes of flies, the ubiquitous filth, and the smoke with which they fill their miserable dwellings, render the people an easy prey to all kinds of ophthalmia. Many came to me at our halting places. Naturally I could do little good. In many the eyes appeared perfectly normal and bright, but they were blind, nevertheless. I had no ophthalmoscope with me, so could not see the fundus. I saw in the Civil Dispensary at Kacha a case of tuberculous dactylitis. The babu there, an intelligent and efficient man, informed me that tubercle was common amongst the people. I myself saw no other case. Smallpox I have already mentioned. There might be many less interesting studies than the relationship subsisting between epidemics and lines of travel, and in no part of the world could it be better pursued than here, where along the great trade routes of the ancient civilized world caravans, have passed, and are still passing to-day, though of diminished importance. Most great epidemics of historical times have originated in Asia, and travelled west along these lines of commerce and pilgrimage: the plague of 1666, the spotted fever of the Middle Ages, cholera, and influenza.

Malaria is little in evidence, a defection little surprising when the lack of breeding places and of shelter for mosquitoes is considered. I saw some pools, long stagnant however, which were black with larvæ of culices, an interesting observation, as it shows that salinity of the water does not adversely affect them. There was one small outbreak of tertian fever amongst the Robat garrison; at the other two posts there was not a case. The constant winds and the severe cold weather must be reckoned as concomitant factors in the production of the malaria-immunity.

Biting flies are common in the hot weather; one species inflicts a particularly severe bite. About the mouths of wells and water-holes swarm enormous numbers of a species of rock bee, and I had a great number of men coming to hospital with severe hornet stings which caused a rapid inflammatory œdema sometimes accompanied by fever. Sand flies are more troublesome than mosquitoes. Whether any of these convey disease is uncertain. Snakes, scorpions, and tarantulas abound, and the old mud buildings harbour crowds of centipedes. Of snakes, the worst is a species of echis, a small viper, which buries itself in the sand with but its head protruding, and bites, with little provocation, man or beast.

There is no country where it is so manifest that if man will not look after himself, Nature, in a grudging way, will do it for him. If he has here, as he has, a peculiar immunity from many diseases, it is not due to his own precautions, but to the curious conditions of existence which Nature here enforces.

Lecture.

REPORT ON A STAFF TOUR HELD IN THE WESTERN COMMAND BETWEEN APRIL 11 AND 14, 1910.

By Major L. WOOD.
Royal Army Medical Corps.

Directors.

Colonel C. W. Thompson, D.S.O., General Staff.
Colonel R. Porter, P.M.O., Western Command.

Officers taking part in the Tour.

Lieutenant-Colonel J. Fallon, R.A.M.C.
Major H. A. Berryman, R.A.M.C.
,, W. S. Burch, Royal Irish Regiment.
,, J. J. Galloway, Royal Engineers.
,, H. J. Russell, Army Service Corps.
,, W. H. Holdsworth Hunt, Royal Garrison Artillery.
,, L. Wood, R.A.M.C.
,, E. P. Connolly, R.A.M.C.

General Instructions.

Rooms have been taken at Long Mynd Hotel, Church Stretton, for all officers, and an inclusive charge of 10s. 6d. per diem for bed, board and lodging will be made.

A paper will be found in the sitting room reserved for officers, and on it they will find the number of their rooms. Officers are requested to sign their names on arrival, on the paper marked for that purpose which will be found in the sitting room.

Dinner will be at 8 p.m., April 11, 1910. All officers will be present by that time.

Officers travelling will claim tickets on Army Book B 205. Each form will be marked on the back "Staff Tour, Western Command, April, 1910."

Applications to bring motor cars (private) should be submitted to the Colonel, General Staff, by April 6.

All travelling claims will be marked "Staff Tour, Western Command, April, 1910," and sent in immediately on completion of the tour.

Sheets 15 and 22 of the ½ in. O.S. Map large sheet series are forwarded herewith.

Synopsis of Events Leading up to War.

That part of the Western Command south of the Mersey, together with those portions of Worcestershire and Gloucestershire west of the

Severn, represent a Republic—RED. The Capital is WELSHPOOL. The remainder of ENGLAND, South of East and West line through LIVERPOOL, represents a BLUE Kingdom—Capital LONDON. North of RED and BLUE lies a strictly neutral state—NORTHUMBRIA. RED has close relations with the Island States of EREN.

RED possesses no fleet, but both EREN and BLUE have considerable Naval forces and large mercantile marines. BLUE has a slight Naval preponderance on paper, whilst EREN has the advantage of experience gained in a recent and successful Naval War.

BLUE's Naval bases are PLYMOUTH, DEVONPORT and PORTSMOUTH, while EREN's are at CORK and WATERFORD.

On April 1, the Foreign Minister of Northumbria allayed public excitement by declaring in Parliament that the clouds which had been gathering lately had dispersed, and that the political horizon was again clear.

The conviction that peace was assured was, however, rudely broken, for, on April 6, BLUE declared war against RED, and both States began to mobilize.

On the morning of the 9th, the world was startled by the news that during the night of the 7th and 8th a desperate attack had been delivered by ERENISH submarines on BLUE ships in PLYMOUTH.

The attackers maintained that they had disabled three Capital ships. The declaration of war by EREN was received in LONDON the same morning.

GENERAL IDEA.

The Field Armies of the opposing States are as follows:—

BLUE.—Six divisions, 4 Cavalry Brigades.

Mobilization Centres: Aldershot—2 Divisions and 1st Cavalry Brigade. Salisbury—1 Division and 3rd Cavalry Brigade. London—2 Divisions. Colchester—1 Division and 4th Cavalry Brigade. The BLUE 2nd Cavalry Brigade mobilized at Canterbury.

RED.—Two Divisions and 2 Mounted Brigades (Establishment as for Territorial Mounted Brigades).

Mobilization Centres:—Cardiff—1st Division complete and Army Troops. Welshpool—4th and 5th Brigades, 2nd Division with Divisional Artillery and 6th Regiment (2nd Mounted Brigade). Chester—6th Brigade, 2nd Division, and 1st Mounted Brigade. Carmarthen—Remainder 2nd Mounted Brigade.

EREN.—Five Divisions and 3 Cavalry Brigades.

CHESTER, WHITCHURCH, SHREWSBURY, LEOMINSTER, HEREFORD and NEWPORT, are entrenched camps, and adequately held by RED. BIRMINGHAM is the only fortress BLUE possesses in the WEST.

The normal mobilization of all three countries required nine days to complete, but EREN started two days later than the others.

The rival BLUE and ERENISH fleets were at sea and a Naval battle was imminent; the allies' hopes of a successful issue were high.

SPECIAL IDEA—RED.

The 1st and 2nd Mounted Brigades (Red) had completed mobilization by the 10th, and had arrived by 7 p.m., 11th, as follows:—

1st Mounted Brigade by road from CHESTER at WHITCHURCH.

4th and 5th Regiments, Horse Artillery, &c., 2nd Mounted Brigade by Central Wales Railway at CRAVEN ARMS.

6th Regiment, 2nd Mounted Brigade by road from WELSHPOOL at CRAVEN ARMS.

Motor transport for 200 Infantry was also collected at WELSHPOOL.

N.B.—RED Mounted Brigades started on the morning of 11th July rationed. Supply depots are formed at WELSHPOOL and BUILTH. Local supplies cannot be depended on.

Intelligence agents reported the arrival of the 1st and 4th BLUE Cavalry Brigades with some horse artillery at BIRMINGHAM, and that the detrainment was completed by midnight 9th to 10th, and also that the 3rd Cavalry Brigade had detrained the morning of the 10th at STRATFORD-ON-AVON. Further, it was stated that the 2nd BLUE Cavalry Brigade mobilization was delayed owing to shortage of horses.

On the evening of the 11th, reports were received that BLUE patrols had been encountered at MARKET DRAYTON, WELLINGTON, and on the WENLOCK EDGE. A BLUE Officer's patrol also boldly trotted up to the Town Hall of LUDLOW. The officer in charge informed the Mayor that he was part of the advanced guard of an army, and demanded the immediate surrender of the town. Fired upon by some members of the local rifle club the patrol returned north east towards BRIDGNORTH. RED patrols had penetrated to HANLEY and STOKE-ON-TRENT without opposition.

Required.—As Director of Medical Services of the RED Forces named in the special idea write a short memorandum giving your views of the situation on the evening of the 11th and probable course of events.

Appreciations should contain recommendations as to:

(1) The composition, allotment and general organization of the Royal Army Medical Corps units and personnel of the RED Force.

(2) Removal of sick and wounded from the field.

(3) The line of communication arrangements for reception, evacuation and ultimate disposal of sick and wounded.

Appreciations to be forwarded to the Principal Medical Officer, Western Command, not later than first post on 6th instant.

April 11, 1910.

On the evening of the 11th, at 9 p.m., a conference was held at the Long Mynd Hotel, Church Stretton, at which the officers' appreciations were returned to them, together with Colonel Porter's criticisms.

The chief mistake made by officers in their appreciations was in the location of hospitals, general and stationary. Some of these had been located in entrenched camps and this was not considered to be a good position. It was pointed out that the presence of large numbers of sick and wounded in an entrenched camp would be likely to affect the *moral* of the troops, and would be undesirable from a medical point of view.

The reasons for selecting certain sites for general and stationary hospitals were in some cases not given by officers. An appreciation being a detailed statement of the situation, the reasons for selecting sites should always be given.

The following is a specimen appreciation :

APPRECIATION OF MILITARY SITUATION FROM THE MEDICAL SERVICE POINT OF VIEW AS DIRECTOR OF MEDICAL SERVICES, RED FORCE.

The points which require consideration are :—

(1) Strength of troops :

	Officers	N.C.Os and men
Two divisions	1,196	38,096
Two mounted brigades	202	3,690
Army troops	199	1,984
	1,597	43,770
Total, all ranks	45,367	

(2) (*a*) The composition, allotment and general organization of the Royal Army Medical Corps units and personnel for the RED Force.

(*b*) Removal of sick and wounded from the field.

(*c*) The line of communication arrangements for reception, evacuation and ultimate disposal of sick and wounded.

(*d*) General forecast of events from evening of 11th.

(3) For a force of the strength detailed as above and operating under ordinary conditions of warfare the composition, allotment and general organization of Royal Army Medical Corps units and personnel for the Red force would be as follows :—

Collecting Zone, i.e., *moving with Troops*—(*a*) Medical establishment with units—54 officers and 868 N.C.O.'s and men. (*b*) Six field ambulances (for two Divisions). (*c*) Two Mounted Brigade Field Ambulances (for 2 Mounted Brigades, T. F.)

Evacuating Zone.—Two Clearing Hospitals. Two Ambulance trains.

Distributing Zone.—Four Stationary Hospitals. Four General Hospitals, two Sanitary Sections, four Sanitary squads, one Base depot medical stores, one advanced depot medical stores.

Hospital accommodation on line of communication and at base should be provided for 6 per cent of strength, viz., 2,716 beds.

As the Line of Communication is necessarily a short one I should send the two Clearing Hospitals, the four Stationary Hospitals and the four General Hospitals to the base WELSHPOOL, opening No. 1 Stationary Hospital and No. 1 General Hospital there at the commencement of hostilities. No. 1 Clearing Hospital would be ordered to hold itself in readiness to move off at a moment's notice. The remaining hospitals would remain there and await further orders, which would be given when the campaign had developed.

(4) The removal of the sick and wounded from the field will be under the orders of administrative medical officers of divisions, the medical service of regimental units and field ambulances dealing with them in the collecting zones. Dressing stations will be selected by administrative medical officers and published in operation orders. Arrangements are being made for a service of motors and country carts to evacuate casualties from the divisions to railhead so as to enable ambulance wagons to remain intact with divisions.

(5) Line of evacuation of sick and wounded will be as follows: CRAVEN ARMS, CHURCH STRETTON, SHREWSBURY, and WELSHPOOL.

After a short discussion on the appreciations submitted the following orders were distributed to each officer.

Operation Orders No. 1. Copy No. 1
By Major-General X
Commanding Red Mounted Brigades.
The Raven, CRAVEN ARMS,
April 11, 1910.

Reference ½ in. Ordnance Map.

(1) The 1st and 4th Blue Cavalry Brigades (less 1 regiment) left BIRMINGHAM at 7 a.m. to-day and marched towards DUDLEY. A Blue Horse Artillery Brigade, with the one regiment mentioned above as escort, left BIRMINGHAM at 10 a.m.

The 3rd Blue Cavalry Brigade left BROMSGROVE at 7 a.m. to-day for KIDDERMINSTER.

Blue patrols have been met this evening at MARKET DRAYTON, WELLINGTON and on the WENLOCK EDGE. A Blue Officer's patrol after entering LUDLOW retired in the direction of BRIDGNORTH.

(2) The Red Mounted Brigades will concentrate to-morrow to keep Blue East of the SHREWSBURY-HEREFORD railway.

(3) The 1st Mounted Brigade under Brigadier-General Y will march from WHITCHURCH at 6 a.m. to-morrow via SHREWSBURY to DORRINGTON. The General Officer Commanding will obtain touch with Blue and with the Red Mounted Brigade at SHREWSBURY as early as possible. He will pay special attention to his left flank.

(4) The 2nd Mounted Brigade under Brigadier-General Z will reconnoitre from LUDLOW to the River SEVERN (north of MUCH WENLOCK) inclusive. He will ascertain the direction of the enemy's march and will delay him as much as possible without becoming so closely engaged that he might be overwhelmed by the enemy's superior forces before the arrival of the 1st Brigade. He will open communications with the 1st Brigade via SHREWSBURY as early as possible.

(5) The main line of resistance against any Blue advance on WELSHPOOL by the ONNY VALLEY will be the ONNY RIVER—NORTON CAMP—CALLOW HILL.

The line of resistance against an advance up the SEVERN VALLEY will be the line of the River SEVERN and COUND BROOK.

(6) The Ammunition Column, 2nd line transport, S. and T. columns of the 1st Mounted Brigade will follow that brigade to SHREWSBURY and remain there.

The same units of the 2nd Mounted Brigade will remain at CRAVEN ARMS.

(7) Field ambulances will be at SHREWSBURY and CRAVEN ARMS.

(8) The Signalling Officer of the 2nd Mounted Brigade will establish communication between the Raven, CRAVEN ARMS, CALLOW HILL and NORTON CAMP.

(9) All reports will be sent to the Raven, CRAVEN ARMS,

A. B., Colonel, G.S.O.

Copy of telegram at 10 p.m. (cypher)

To Chief of Staff, WELSHPOOL :—

Please dispatch 200 Infantry in motor transport to CRAVEN ARMS at once.

X Major-General,
Commanding 2nd Mounted Brigade.

The following orders were issued to the several Royal Army Medical Corps Officers :—

The Director of Medical Services : On the information at your disposal, please issue instructions to all concerned with reference to Clearing and Stationary Hospitals now at the base (WELSHPOOL) and No. 1 Ambulance Train in neighbourhood WELSHPOOL. Write a draft order for Operation Orders dealing with the following points : General line of evacuation of sick and wounded, any special sanitary requirements of the Army, any necessary notifications concerning position of Line of Communication medical units.

Deputy Director of Medical Services : Please proceed to WELSHPOOL, and report on sites for medical units at base, entraining and detraining facilities, buildings suitable for medical purposes and local supplies and transport.

Officers Commanding Mounted Brigade Field Ambulances : Issue necessary orders and write a narrative of events.

Acting on these instructions the following orders, &c., were submitted by the officers taking part in the tour :—

Director of Medical Services : From Director Medical Services, Red Force. To Headquarters, Line of Communication, WELSHPOOL.

(1) Arrange to send immediately No. 1 Clearing Hospital to CRAVEN ARMS to open there at 4 p.m. the 12th instant.

(2) Arrange to send immediately No. 2 Clearing Hospital to SHREWSBURY, there to await orders. It should arrive at 12 noon on the 12th instant.

(3) Arrange for Nos. 1 and 2 Stationary Hospitals to proceed to SHREWSBURY and open without delay.

(4) Arrange for No. 1 Ambulance train to be at SHREWSBURY at 10 a.m. the 12th instant, ready to move on receipt of orders.

Headquarters, A.B.,
WELSHPOOL, Colonel,
10 p.m. By motor cyclist. D.M.S., Red Force.

Draft for insertion in Operation Orders by General Officer Commanding-in-Chief, Red Force.

The general line of evacuation will be by the railway north and south to SHREWSBURY, thence to the Base Hospital at WELSHPOOL.

No. 1 Clearing Hospital will be at CRAVEN ARMS at 4 p.m. on the 12th inst.

No. 2 Clearing Hospital will be at SHREWSBURY at 12 noon on the 12th inst., awaiting orders to assist No. 1 Mounted Brigade Field Ambulance.

Special attention is drawn to the fact that due care should be taken by the mounted troops in choosing places for drinking water, which are likely to be numerous. There should be no obvious contamination for a mile above the site from which the water is taken.

Headquarters, A.B.,
WELSHPOOL, Colonel,
11 p.m. By Orderly. D.M.S., Red Force.

The following criticisms were made :—

(1) The Director of Medical Services does not send communications direct to Headquarters Line of Communication. All communications should go through the Adjutant-General.

(2) CHURCH STRETTON would have been a more convenient place to have opened a clearing hospital than CRAVEN ARMS.

(3) The opening of Nos. 1 and 2 Stationary Hospitals at SHREWSBURY would be a doubtful measure at this stage, and, moreover, they would hardly be necessary.

(4) A Clearing Hospital open at CHURCH STRETTON, one awaiting orders at SHREWSBURY and an Ambulance Train would give sufficient hospital accommodation to meet present requirements.

(5) Draft for Operation Orders approved except that the special sanitary measures would seem to be unnecessary, as the Force Standing Orders would include these matters.

REPORT OF DEPUTY DIRECTOR OF MEDICAL SERVICES.

Report.

(1) *Entraining and Detraining Facilities.*—The station, L. & N.W. Railway, is a good stone building, large booking hall where a dozen

stretchers could be placed temporarily, a good refreshment room and two waiting rooms. There are three water closets and six men's urinals. Room alongside main platform for twenty coaches, the platform being under cover the whole length. Water supply from town would meet needs of entraining, &c. Station gas-lit. Approach, there is a wide sweep outside the station, room for at least fifteen ambulance wagons in line if this platform were available. Detraining sick and wounded could be carried out with great rapidity. If this is not available, there is a goods shed in which six coaches can run alongside a large platform 130 ft. long by 50 ft. wide. This shed is under cover, the line running through it. The wagons could be backed into the wagon entrance for loading or unloading. There is a turn-table at the station and ample shunting accommodation. Of course no urinal or water-closet accommodation exists in the shed. This would have to be improvised.

(2) *Site for Two General Hospitals* (*two already open*).—The site selected is (map SHREWSBURY, sheet 16) 1¼ miles from railway station south-east on right bank of SEVERN. It lies on good grass land south of WELSHPOOL-BUTTINGTON Road and parallel to it. West long., 3° 8′, lat. 52° 40 . There is abundant water in the river SEVERN ¼ mile south, which would require to be filtered or boiled. There is more than enough room for two general hospitals and for expansion if necessary.

Produce.—District agricultural. Milk, eggs, poultry, would be easily obtainable.

Transport.—The following wagons are registered in the borough register :—

Two wheeled	101
Four wheeled (over 25 cwt.)	85
Two ,, (under ,,)	23

Animals for above would have to be reported on by the A.S.C. Smaller vehicles belonging to the town would be few in number.

Buildings.—The Town Hall would be a good building for Base Depot Medical Stores, but not for sick, it being surrounded by other houses. There are nine churches and chapels in all and a small local Infirmary, but none are advised for use if they can be dispensed with.

Drugs, &c.—No reliance can be placed on the local supply of medicines, dressings, &c., as they would probably only suffice for the inhabitants of the town (4,000). Small supplies of bedding and clothing only could be obtained.

(Signed) C—D,
April 12, 1910. D.D.M.S.

Comments on above report. A clear report.

NARRATIVE OF EVENTS AND ORDERS ISSUED BY THE OFFICER COMMANDING FIELD AMBULANCE.

Narrative of Events.

On the assumption that the 2nd Mounted Brigade has been ordered to move off at 6.15 a.m. on the 12th inst., the 2nd Mounted Brigade Field Ambulance is ordered to parade at 6 a.m. and to proceed with the 2nd Mounted Brigade. One light ambulance wagon is detailed to march with the three Yeomanry Regiments and one with the Royal Horse Artillery.

As only one Regiment of the 2nd Mounted Brigade has proceeded to CRAVEN ARMS by road, very few sick have up to the present been admitted to the Field Ambulance. These sick have been handed over to the Red Cross Society.

ROYAL ARMY MEDICAL CORPS ORDERS BY LIEUTENANT-COLONEL E., COMMANDING 2ND MOUNTED BRIGADE FIELD AMBULANCE.

CRAVEN ARMS, 10 P.M., APRIL 11, 1910.

(1) The 2nd Mounted Brigade Field Ambulance will parade at 6 a.m. to-morrow morning, and will accompany the 2nd Mounted Brigade.

(2) One light ambulance wagon will proceed with each Yeomanry Regiment, and with the Royal Horse Artillery, and will be held at the disposal of the Medical Officer in Command of the unit.

(3) Each man will be provided with one day's half cooked rations which he will carry in his haversack.

(4) All sick in the Field Ambulance will be handed over to the local detachment of the Red Cross Society at CRAVEN ARMS.

(Signed) E. Lieutenant-Colonel, R.A.M.C.,
Commanding 2nd Mounted Brigade,
Field Ambulance.

The following additional information was then given with instructions to the Director of Medical Services, and the Officer Commanding Mounted Brigade Field Ambulance, to issue necessary orders, &c.

INSTRUCTIONS FOR GENERAL OFFICER COMMANDING MOUNTED BRIGADES (RED).

(*Cypher Telegram.*)

According to trustworthy information the BLUE Horse Artillery that arrived at BIRMINGHAM on the night 9th—10th consisted of a complete Horse Artillery Brigade, but owing to delay in arrival of the ammunition column the Artillery was unable to leave BIRMINGHAM till 10 a.m. this morning. The 1st and 4th Brigades, less one regiment left as escort to Artillery, quitted BIRMINGHAM at 7 a.m. this morning, and marched towards DUDLEY. Also the 3rd Cavalry Brigade from STRATFORD-ON-AVON bivouacked last night at BROMSGROVE and left that town at 7 a.m. this morning for KIDDERMINSTER. Apparently the enemy intends to make an attempt to interfere with the mobilization of our forces at WELSHPOOL, and to create a panic in that city. Your primary duty is to protect the Capital and keep the enemy EAST of the HEREFORD—SHREWSBURY railway line.

Two hundred infantry in motor transport, speed eight miles an hour, are at your disposal if required. Beyond this force no help can be sent to you till the 15th instant.

A telegram has just been received announcing the destruction of the BLUE Fleet in a battle in the Atlantic Ocean yesterday.

WELSHPOOL, (Signed) H. B., Brigadier-General,
April 11, 1910. General Staff.
Dispatched at 9.15 p.m.
Received at 9.35 p.m.

The Divisional Field Ambulances have also joined the respective divisions, and one field ambulance with army troops. Line of Communication Medical Units are placed as follows :—

Nos. 1 and 2 general hospitals at Welshpool open and ready to receive sick and wounded.

Nos. 3 and 4 are in reserve at Welshpool.

Nos. 1, 2, 3, 4, stationary hospitals, and Nos. 1 and 2 clearing hospitals, are at Welshpool ready to move when required.

Nos. 1 and 2 ambulance trains are working on the lines between Welshpool and the Field Army.

No. 1 Sanitary Section is working at Welshpool.

No. 2 Sanitary Section and four sanitary squads are at the same place awaiting orders.

ORDERS, &c., BY DIRECTOR OF MEDICAL SERVICES.

Draft for insertion in Operation Orders by Major General X, Commanding Red Mounted Brigades.

(1) Sick and casualties of 1st Mounted Brigade to be left at SHREWSBURY on the march SOUTH.

(2) A bearer sub-division of No. 2 Mounted Brigade Field Ambulance has been ordered to SHIPTON, point 488 on the CRAVEN ARMS—MUCH WENLOCK Road to form a rallying-point for the light ambulance wagons and other casualties. Casualties to be evacuated by the same road to CRAVEN ARMS. This sub-division will be at point 488 at 11 a.m. to-morrow.

The Raven, (Signed) A. B., Colonel,
Craven Arms. A.M.O. Red Mounted Brigade.
10 p.m., April 11, 1910.

CORPS ORDERS BY COLONEL A. B., ADMINISTRATIVE MEDICAL OFFICER, RED MOUNTED BRIGADES.

To Officer Commanding 1st Mounted Brigade Field Ambulance, WHITCHURCH.

On arrival at SHREWSBURY hand over sick and casualties to No. 2 clearing hospital there. Further orders will be sent to you at DORRINGTON.

Craven Arms. (Signed) A. B., Colonel,
10 p.m.. 11.4.10. By telegram. A.M.O.

CORPS ORDERS BY COLONEL A. B., ADMINISTRATIVE MEDICAL OFFICER RED MOUNTED BRIGADES.

To Officer Commanding 2nd Mounted Brigade Field Ambulance, CRAVEN ARMS.

(1) Use your light ambulance wagons to the best advantage in keeping in touch with the bodies of mounted troops EAST of line LUDLOW—MUCH WENLOCK.

(2) Send a bearer sub-division at 6 a.m. to-morrow the 12th inst. to SHIPTON at point 488 on the CRAVEN ARMS—MUCH WENLOCK Road to form a rallying point for the light ambulance wagons. Sick and casualties to be sent into CRAVEN ARMS by the same road. Remainder to stand fast at CRAVEN ARMS to await developments.

CRAVEN ARMS. (Signed) A. B., Colonel,
10 p.m., 11.4.10. By orderly. A.M.O.

To Administrative Medical Officer Mounted Brigades, The Raven, Craven Arms.

(1) No. 2 Clearing Hospital has been ordered to open at 12 noon to-morrow at SHREWSBURY.

(2) No. 1 Clearing Hospital has been ordered to be at CRAVEN ARMS at 4 p.m. to-morrow.

From Director of Medical Services, WELSHPOOL, 9 p.m. April 11, 1910. By telegram.

From Director of Medical Services. To Headquarters, Lines of Communication.

(1) Reference to order No. 3 of orders issued at 10 p.m. from Director of Medical Services to Headquarters Lines of Communication: This order is hereby cancelled.

(2) No. 2 Clearing Hospital at SHREWSBURY will evacuate direct to General Hospital at WELSHPOOL. No. 1 Ambulance train should not be employed for this purpose.

WELSHPOOL, 12 midnight. By cyclist orderly.

From Director of Medical Services. To Deputy Director of Medical Services, Lines of Communication, WELSHPOOL.

Arrange for suitable sites for Nos. 1 and 2 Clearing Hospitals, at CRAVEN ARMS and SHREWSBURY respectively.

Access to and neighbourhood of suitable railway siding should be considered.

WELSHPOOL. (Signed) A. B.
11. p.m. April 11, 1910. D.M.S. Red Force.
By cyclist orderly.

COMMENTS ON ORDERS, ETC., BY THE DIRECTOR OF MEDICAL SERVICES.

The designation Administrative Medical Officer, Red Mounted Brigade, is an incorrect one.

The Officer Commanding Mounted Brigade Field Ambulance would generally be the Senior Medical Officer of the Brigade, and it would be to him that any instructions or information, which you wished to convey, would be sent.

Your message undated WELSHPOOL, dispatched 12 midnight has same error as previous message sent to Lines of Communication. Message should read "From Adjutant-General to Headquarters, Lines of Communication."

No. 2 paragraph of message seems contradictory. How are the sick to be evacuated if not by ambulance train?

When orders are issued they are meant for the troops serving under the officers who sign them.

Instructions or any information you wish to convey should have been conveyed in message form.

NARRATIVE OF EVENTS AND ORDERS ISSUED BY THE OFFICER COMMANDING FIELD AMBULANCE.

Narrative of Events, April 12th, 1910.

In accordance with orders received from the Administrative Medica Officer Cavalry Brigades Red Force, one light ambulance wagon was despatched with each unit of the 2nd Mounted Brigade, and was placed at the disposal of the Medical Officer. This was communicated to the various Medical Officers concerned.

The Bearer Sub-division of B. Section was despatched to SHIPTON, in order to keep in touch with the light ambulance wagons, and was ordered to report by telegram any casualties received to the Officer in Command, 2nd Mounted Brigade Field Ambulance at CRAVEN ARMS.

At 4.30 p.m. a telegram was received from the Officer Commanding Bearer Sub-division, B. Section, stating that 14 casualties had been handed over to him by the light ambulance wagons, and that the brigade was apparently retiring from the position which they had occupied during the day. He was ordered by telegram to return at once to CRAVEN ARMS bringing any casualties with him. Arrangements were made for the reception of these casualties at No. 1 Clearing Hospital.

Craven Arms.
April 12, 1910.

(Signed) E. F.
Commanding 2nd Mounted
Brigade Field Ambulance.

ROYAL ARMY MEDICAL CORPS ORDERS BY LIEUTENANT-COLONEL E. F., COMMANDING 2ND MOUNTED BRIGADE FIELD AMBULANCE.

CRAVEN ARMS, 10 30 p.m. April 11, 1910.

(1) One light ambulance wagon will proceed with each Regiment of Yeomanry, and with the Royal Horse Artillery at 6 a.m. to-morrow

morning, the 12th inst, and will be under the orders of the Medical Officer in Command of the unit to which they are attached.

(2) The Bearer Subdivision of B Section will proceed by the CRAVEN ARMS—MUCH WENLOCK road to SHIPTON, where it will be prepared to take over any casualties from the light ambulance wagons with the units. The Officer Commanding will report any casualties received to Headquarters 2nd Mounted Brigade Field Ambulance at CRAVEN ARMS.

(3) A section of the tent subdivision of B Section will remain at CRAVEN ARMS and await further orders.

(Signed) E. F., Lieutenant-Colonel,
R.A.M.C.,
Commanding 2nd Mounted Brigade,
Field Ambulance.

Comments on above Narrative and Orders.

Orders issued are correct in form. It would appear unnecessary to report casualties as they occur. The scale of Ordnance Map referred to should be stated.

On the evening of April 12, after the work which had been performed during the day had been discussed, the following narrative of events was given to all officers :—

NARRATIVE OF EVENTS, 7 p.m., APRIL 12.

Combatant Forces.—At 7 a.m. Patrols of the 2nd Mounted Brigade came in contact with the Blue Mounted Patrols on the WENLOCK EDGE between LONGVILLE and SKIPTON. At 8 a.m.—The main body of the 2nd Mounted Brigade began to engage that of the enemy. A fight ensued, in which Blue appeared in greatly superior numbers; Red was losing heavily. At 9.30 a.m.—Red 2nd Mounted Brigade retired on CHURCH STRETTON via HOPE BOWDLER, and took up a position on the hills RAGLETH—CAER CARADOC. Blue followed up, but finding Red's position too strong he retired on the line LONGVILLE—RUSHBURY—EATON. The Motor Infantry took up a position on high ground 2 miles north of WISTANGLOW. At 5 p.m.—The 1st Mounted Brigade arrived at BAYSTON HILL, where it encamped for the night.

Medical Units. Clearing Hospitals:—No. 1 arrived at CHURCH STRETTON at 9 a.m., and opened 1½ miles east of Railway Station. No. 2 remains at SHREWSBURY awaiting orders. Ambulance train arrived SHREWSBURY, 8 a.m. and is awaiting orders.

Casualties during April 12, twenty-four killed, ninety-six wounded.

Required.—Each Medical Officer was required to write a short appreciation of the situation as it appeared at 7 p.m., on April 12.

SPECIMEN APPRECIATION.

Appreciation of the Situation at 7 p.m. on April 12.

Casualties to be dealt with 2nd Mounted Brigade.

60 per cent.	ride or walk	57
20 ,,	require sitting accommodation	20
15 ,,	,, lying accommodation	15
5 ,,	too seriously wounded to move	4
		96

2nd Mounted Brigade Field Ambulance, less four light ambulance wagons detached with Brigade, has retired under orders to HOPE BOWDLER, 2 miles S.W. CHURCH STRETTON, here forming collecting station with dressing station in village school.

Bearer Division.—Eight squads are sent forward to co-operate with regimental bearers. Advice is sent to Regimental Medical Officers to direct all wounded able to ride or walk to proceed to HOPE BOWDLER.

The distance from WENLOCK EDGE to CHURCH STRETTON is about 5 or 6 miles.

All wounded unable to walk will be collected at HOPE BOWDLER by 1 p.m., April 12, 1910.

Two large ambulance wagons take twenty sitting cases.

Four large ambulance wagons take fifteen lying down cases.

Some of those able to ride may require sitting accommodation from HOPE BOWDLER. Three light ambulance wagons would be able to convey thirty cases of this description to CHURCH STRETTON. Fresh horses could, if necessary, be obtained from the G.S. wagon teams. All wounded should arrive at CHURCH STRETTON by 6 p.m.

An ambulance train will convey all wounded able to travel, probably about seventy, to WELSHPOOL, where they should arrive about midnight, 12th—13th. The ambulance train to return as soon as possible to Clearing Hospital at CHURCH STRETTON, in order to remove the remainder of the wounded, if possible, next morning. Cases requiring operation will be treated at the Clearing Hospital, and not at HOPE BOWDLER.

The tent division of the Field Ambulance will make provision for the four cases too ill to move until the morning of the 13th, unless they are in the hands of the enemy.

Comments on Appreciation.

No mention is made of the Clearing Hospital which is at CHURCH STRETTON, or of any orders for the ambulance train in case of the railway being cut. Some efforts should be made to remove the Clearing Hospital to a place of safety, and particularly as Red is likely to make a stand on the LONG MYND it would be urgently required.

April 13, 1910.

On the evening of April 13, the following narrative of events was given to officers :—

Narrative of Events up to 12 *midnight, April* 13-14.

By nightfall (8 p.m).—1st and 2nd Mounted Brigades had joined hands on LONG MYND, and were preparing a defensive position West of CHURCH STRETTON. The motor infantry retired from the WISTANSTON HILL to BLACK KNOLL (South edge of LONG MYND).

During the day of 13th. Considerable movement of mounted troops has been seen on CALLOW HILL.

CRAVEN ARMS was occupied by strong Blue patrols by 10 a.m., who endeavoured to work Northwards, but were checked by the motor infantry. The hills East of railway (CAER CARADOC, &c.), were occupied by Blue patrols on the retirement of Red.

Information received at 12 midnight. General Officer Commanding Red received the following message from Officer Commanding SHREWSBURY:—

SHREWSBURY,
April 13, 1910. 10.30 p.m.

A shepherd from CARDINGTON arrived here at 10.15 p.m. and stated that at 8 p.m. a large body of mounted troops arrived at CARDINGTON and there bivouacked. Questioned closely as to their exact numbers, he could give no satisfactory replies, but said there was a "mort." He appears reliable.

INSTRUCTIONS TO MEDICAL OFFICERS.

The two Mounted Brigades of Red force retired on to the LONG MYND on the evening of the 12th.

The Director of Medical Services is informed that a battle is imminent.

The O.C. Line of Communication has sent a message to the effect that Blue Cavalry threaten the line South of SHREWSBURY, and he is of opinion that it may be rendered unworkable at any moment.

Thirty empty supply wagons will be available for transport purposes.

Prepare plan for evacuation of wounded by road to WELSHPOOL from LONG MYND.

Show position of Medical units with Brigades and state how the Clearing Hospital at CHURCH STRETTON should be dealt with.

It should be kept in mind that BISHOPS CASTLE rail and road is also threatened after 7 p.m. of the 13th inst.

Appreciation of the situation on the evening of April 12*th.*

The points to be considered are:—(*a*) The removal of the Clearing Hospital from CHURCH STRETTON. (*b*) The position of Medical units with Brigades. (*c*) The evacuation of wounded by road to WELSHPOOL.

(A) Immediately on information being received that the Red Mounted Brigades are retiring on LONG MYND, arrangements are made to remove the Clearing Hospital from CHURCH STRETTON to CHURCH STOKE. Seventeen of the available thirty G.S. wagons are sent by road to

Lydamheath station, a journey which they should perform in 3½ hours, to await the arrival of the Clearing Hospital from Church Stretton. This should leave Church Stretton about 11 p.m. and arrive Lydamheath station about midnight. It would then be loaded on the seventeen G.S. wagons leaving Lydamheath station about 2.30 a.m., and arriving at Church Stoke, a distance of about six miles, at 4 a.m. on the 13th inst.

(B) Position of Medical units with Brigades:

No. 1. Mounted Brigade Field Ambulance—Wentnor.

No. 2. Mounted Brigade Field Ambulance—Myndtown.

The reason for choosing these two situations, is that they are on a good road to Church Stoke and Welshpool, and that there would be a good water supply in both places.

(*c*) Evacuation of wounded to Welshpool.

Strength of force:—

Two mounted Brigades	3,892
Infantry	200
	4,092
Less casualties..	120
	3,972

As severe fighting is to be expected, the number of casualties would probably be at least 12 per cent. of the troops engaged. Taking the strength of the force as 4,000 this would give a casualty list of 480, of which the condition would probably be as follows:—

20 per cent.	killed	100
Of the remaining casualties—		
60 per cent.	able to walk	288
20 ,,	require sitting accommodation	96
15 ,,	,, lying accommodation	72
5 ,,	cannot be moved	24
		480

After seeing the position it is obvious that the real difficulty to be faced in evacuating wounded would be to get them to the Field Ambulances. The only way in which this could be done would be by the mutual arrangements of positions which should be definitely marked out (flagged), between the Bearer Divisions of the Field Ambulances and the medical personnel with units. As the country is quite impossible for ambulance wagons, it is doubtful if many of the wounded would have arrived in the Field Ambulance by nightfall, and it is probable that the 361 wounded fit for removal would not be collected there before 12 noon on the 14th instant.

The first wounded to arrive in the hospitals would be dispatched to Church Stoke in the ambulance wagons in order that these might be again utilized on their return.

Accommodation of Ambulance Wagons.

12 heavy wagons; 48 lying down cases.

8 light wagons; 64 sitting cases.

If the first of the ambulance wagons were dispatched at 12 noon on the 13th inst., it should perform the double journey, eighteen miles, by 8 p.m. on the 13th inst. The ambulance wagons would thus all be available for duty on the 14th inst.

The G.S. wagons would then remove:

5 wagons; 9 lying down cases; and 4 sitting cases.
8 wagons; 64 sitting cases.

This would leave twenty-four sitting cases which would be removed by transport collected locally.

On arrival of the wounded at the Clearing Hospital all cases would have first aid rendered, and those requiring it would be detained. The remainder would be dispatched in transport obtained from WELSHPOOL via CHIRBURY and EDDERTON HALL to WELSHPOOL.

Comments on above Appreciation.

No. 1 ambulance train running between CHURCH STRETTON and WELSHPOOL seems to have been forgotten.

Instructions should have been sent to Headquarters Line of Communication, notifying them of the move of the Clearing Hospital so that the Deputy Director of Medical Services could have given orders to the train to remain at WELSHPOOL.

After performing the above work on the 13th inst., the following alterations were made :—

One officer appointed Administrative Medical Officer of the Cavalry Division.

Remaining officers: Officer in Command of the Cavalry Field Ambulances.

The following orders were issued to the Administrative Medical Officer :—

You are appointed Administrative Medical Officer of the Cavalry Division operating against Red.

Required.—Plan of medical arrangements for to-morrow's battle which should contain :—

(*a*) A short appreciation of the situation, mentioning the conditions affecting evacuation of sick and wounded, and the evacuation of wounded during the battle.

(*b*) Royal Army Medical Corps orders.

(*c*) Draft order for insertion in Divisional Orders.

APPRECIATION OF MEDICAL SITUATION FROM POINT OF VIEW OF ADMINISTRATIVE MEDICAL OFFICER, CAVALRY DIVISION, BLUE FORCE.

April 13, 1910, 7 p.m.

(1) The Cavalry Division is 7,200 strong and about to attack.

(2) A half clearing hospital has been ordered to LONGVILLE.

(3) The road journeys from the front to this clearing hospital are short.

(4) An ambulance train and some ordinary coaches and a number of fitted-up trucks, have been promised to arrive to-morrow afternoon at LONGVILLE.

(5) The general line of evacuation for the wounded is LONGVILLE—MUCH WENLOCK — SHIFNAL — WOLVERHAMPTON — BIRMINGHAM, along which are the necessary Lines of Communication medical arrangements.

(6) The number of casualties is anticipated to be roughly 720, of which 570 will be wounded and the remainder killed. The ambulance wagons of the three Cavalry Field Ambulances will not be able to get all the wounded to LONGVILLE by evening without the assistance of G. S. wagons. Twenty of these will be required to carry 160 sitting cases and are being arranged for.

Signed Colonel,
A.M.O. Cavalry Division.

DRAFT FOR CAVALRY DIVISION OPERATION ORDERS, No. 23, DATED, APRIL 13, 1910.

(1) No. 2 Cavalry Field Ambulance is allotted to the troops in the centre about CHURCH STRETTON.

No. 3 Cavalry Field Ambulance is allotted to the troops on the left flank about LITTLE STRETTON.

No. 1 Cavalry Field Ambulance is allotted to the troops operating on the right flank about ALL STRETTON.

(2) Dressing stations will be established at ALL STRETTON, CHURCH STRETTON and LITTLE STRETTON.

(3) Roads allotted for removal of wounded by railway line are as follows:—

No. 1 Field Ambulance, via COMLEY and CARDINGTON to LONGVILLE.

No. 2 Field Ambulance, via HOPE BOWDLER and WALLSBANK to LONGVILLE.

No. 3 Field Ambulance as for No. 2.

CAER CARADAC,
April 13, 1910.

(Signed) Colonel,
A.M.O. Cavalry Division.

CORPS ORDERS BY COLONEL, COMMANDING ROYAL ARMY MEDICAL CORPS CAVALRY DIVISION.

With reference to Cavalry Division Operation Orders No. 23, dated April 13, 1910.

(1) Dressing stations will be opened at 8 a.m. to-morrow.

(2) One tent sub-division of No. 2 Cavalry Field Ambulance will not be opened till further orders.

(3) One tent sub-division of No. 3 Cavalry Field Ambulance will not be opened until further orders.

(4) A half clearing hospital will be opened to receive wounded at LONGVILLE at 11 a.m. to-morrow.

By cyclist orderly to Officer Commanding Nos. 1, 2, 3, Cavalry Field Ambulances.

Signed, Colonel
A.M.O. Cavalry Division.

CAER CARADOC, 8 p.m.
April 13, 1910.

ROYAL ARMY MEDICAL CORPS ORDERS BY LIEUTENANT-COLONEL R.A.M.C. COMMANDING 2ND CAVALRY BRIGADE FIELD AMBULANCE, BLUE FORCE.

RAGLETH HILL,
10 p.m., April 13, 1910.

(1) Reveille to-morrow morning 4 a.m., breakfast 5 a.m.

(2) The Field Ambulance will march off at 6 a.m., and will proceed as follows:—

Bearer Division and tent sub-division of A section with the troops to CHURCH STRETTON.

Tent sub-division of B Section to HOPE BOWDLER where it will await further orders.

(3) The tent sub-division of A section will form a dressing station at the "Hotel," CHURCH STRETTON.

(4) The Bearer Division will keep in touch with the troops engaged from CHURCH STRETTON.

(5) Route of evacuation for sick and wounded HOPE BOWDLER—WALLSBANK—LONGVILLE.

Signed, Lieutenant-Colonel,
Commanding 2nd Cavalry
Field Ambulance.

Reviews.

MEDICAL SERVICE IN CAMPAIGN. A Handbook for Medical Officers in the Field. By Major Paul Frederick Straub. Medical Corps (General Staff), United States Army. Published by Rebman, Ltd., 1911, pp. vii. + 164. Price 6s.

This book is founded on a series of lectures given by the writer at a Medical Department Camp of Instruction held in the United States in July, 1909. The object of the lectures was to instruct medical officers in the military side of their duties.

It was an American observer who, in his report on what he had seen in Manchuria, said that the Russians had done much to train physicians for the Army but nothing to train medical officers. This book is an earnest of the intention to avoid such a mistake in America.

It is remarked that, though the professional education of the medical officers in the United States Army relating to medical and sanitary subjects has hitherto left little to be desired, proportionate attention has not been given to instruction in the work with which they will be confronted in war, and this omission is attributed to the former starved establishment of the Medical Corps, which did not allow of any officers being spared from their current professional work, even for so important an object as instruction in their own special duties on campaign.

With an increased establishment it is now possible to give officers facilities for this necessary training; and to emphasize the importance of this study the solution of a medico-military problem, has been made a compulsory subject in the examination of majors for promotion.

The book is divided into ten chapters.

Chapter I. is introductory and gives a very clear and convincing account of the necessity for, and importance of such military education for the medical officer, if he is to be fitted for the duties and responsibilities which devolve on him in war.

Chapter II. deals with collateral subjects such as Orders, Map Reading, Weapons, Casualties and Transport.

The section on Casualties is particularly well worth reading. The Manchurian figures are carefully studied and the conclusions arrived at are eminently sane and moderate. The lessened mortality from wounds as compared with the figures of the American Civil War and the Franco-German War of 1870-71 is attributed, no doubt rightly, to improved surgical methods; but the writer does not omit to mention that wounds caused by modern small bore bullets, are not so liable to infection as those caused by the old heavier missile, and from their narrower track are less likely to damage neighbouring vital parts.

In this connection it may not be amiss to point out, that the very large number of recoveries and the increased rapidity of their cure, is investing the hospitals with enhanced importance as units in the military machine, owing to the ever-growing number of men they are able to restore to the ranks; they are, in fact, becoming more and more great repairing shops for the army in front, without however, in any way sacrificing their functions as havens for those unable to return.

With regard to the number of casualties to be expected in future wars, the opinion is expressed that the proportion will not vary materially from that of wars which have already taken place, and that the carefully-prepared statistics of the American Civil and the Franco-Prussian Wars are by no means obsolete.

The writer draws attention to the military necessity of saving the more slightly wounded first, and points out that the severer cases gain rather than lose by being spared early and rapid transport to a distance. This is a lesson which has won its way but slowly, though now generally recognized as correct.

The various categories of battle casualties are estimated as follows:—

Killed 20 per cent; non-transportable 8 per cent: requiring transport 32 per cent; (lying down 12 per cent, sitting up 20 per cent); able to walk to dressing station and field hospital 28 per cent; able to march to advanced base 12 per cent.

This estimate, that 40 per cent of casualties should be able to walk off the field, avoids the extremes of some observers who wrote from Manchuria, and in the light of present knowledge is not unduly sanguine.

Further chapters deal with the Organization and Administration, with Battle Dispositions and the whole chain of the medical service from the regimental line in front through the dressing stations, field hospitals and line of communications to the base.

The chapter on the Lightly Wounded Station is of special interest at present.

The book throughout deserves careful reading. It offers in a concise and handy form much that the military surgeon must know, and must otherwise search for in many disconnected publications. It is commended to the attention of all military medical officers.

M. W. R.

SURGERY OF THE DISEASES OF THE APPENDIX. By Battle and Corner. London: Constable, 1910, pp. xv. + 291. Price 10s. 6d. net.

In this second edition of their book the authors have presented in a compact and easily available form the essence of a large amount of current literature, and have enriched the book with a large number of new illustrations. Beginning with the anatomy and physiology of the appendix (and it may be observed that they do not regard the appendix as a useless and vestigial structure), the authors then classify and describe inflammatory conditions. Here the increase of the disease in recent years is touched upon, and the substitution of white flour milled with steel rollers for stone-ground flour put forward as a possible cause of local irritation. Methods of operation during the quiet period are next considered, and the place of the early operation in treatment. Under the heading of complications, the various forms of peritonitis, localized and generalized, which may be associated with an inflamed appendix, with their treatment, are then dealt with. The authors think that in all cases, except when the appendix has sloughed off and is lying free in the cavity of an abscess, it should be removed subsequently, if it was not considered advisable to remove it when the pus was evacuated. The insidious onset of peritonitis in some cases is insisted upon and the value of various symptoms estimated. In the chapter on Treatment it is pointed out that in peritonitis secondary to appendix disease the treatment is primarily surgical and that much depends on early and rapid work. The authors seem inclined to rely more on thorough cleansing of the peritoneum than on multiple openings for drainage, and think that rapid evisceration for cleaning is likely to cause less shock than more prolonged intra-abdominal manipulations. As the second line of treatment, the various methods of saline infusion, purgatives, vaccines and the production of artificial leucocytosis by means of nucleic acid are considered. A useful chapter follows on the "acute abdomen," symptoms of critical value in differentiating appendicitis from other acute abdominal conditions, and the diagnosis of cases requiring operation from those which do not. The rarer diseases of the appendix, such as intussusception, malignant disease (a copious bibliography is given for this), actinomycosis and tuberculosis are next shortly reviewed, and then follows an account of the more uncommon sequelæ, in which most space is given to subdiaphragmatic abscess, hæmorrhage from stomach and bowel, intestinal obstruction and the relation of the appendix to hernia. Peculiarities seen at different ages are next touched upon with illustrative cases, and the last two chapters deal with the differential diagnosis of iliac tumours and the relation of appendicitis to selection for life insurance.

We note some verbal inaccuracies and an unfinished sentence on page 64, but merely note them as part of the duty of a critic and not as in any sense detracting from the value of an admirable exposition of appendicular disease. E. M. P.

MEDICAL ANNUAL, 1911. Bristol: Wright and Sons, Ltd., pp. cxv. + 991. Price 8s. 6d. net.

This is the twenty-ninth issue of this well-known year book, and it more than maintains its former reputation. To army medical officers and others whose library is necessarily limited it is all but indispensable, giving as it does in compact form an account of all the chief advances in medicine and allied sciences which have taken place during the past year. Among the special articles in this issue is one by Dr. Morton on Pathology and Electro-therapeutics, another on Hormones by Dr. Bertram Collingwood, and a very valuable paper on the Diagnosis of Morbid Tissues, by Dr. Oscar C. Gruner. This should be helpful not only to the man who has facilities for making complete examinations of tissues, but also to the clinician, since if he carries out the instructions as to the early treatment of his specimen, he will less frequently hear from the pathologist that the tissue was spoiled during the early stages by the use of an unsuitable fixative. Among other articles the one on syphilis gives a good account of the position with regard to "606" at the end of 1910. The articles on Tropical Medicine have been written by Dr. J. W. Stephens, and give brief but clear accounts of the main advances which have been made in this subject during the past year. W. S. H.

THE LIFE-HISTORY, FUNCTION AND INFLAMMATION OF THE APPENDIX. By Edred M. Corner, F.R.C.S. London: J. Bale, Sons and Danielsson, Ltd., 1911. Pp. 23, price 1s. net.

This little brochure of scarcely 23 pages is an attempt to give in a semi-popular form, some generalities on the ileo-cæcal region. The underlying idea of this pamphlet is expressed in the final paragraph where the author maintains that the appendix should be removed much more frequently than it is, particularly in middle life. Apparently the general practitioner is slow to realize this necessity, which is made evident in these few pages.

J. W. H.

CONSUMPTION: ITS PREVENTION AND TREATMENT. By E. W. Diver, M.D., &c., late Resident Physician "Belle Vue" Open Air Sanatorium, Shotley Bridge (now closed). London: John Bale, Sons and Danielsson, Ltd., 1911. Price 2s. 6d. net, with six illustrations.

This book has been compiled by Dr. Diver from notes taken by him during conversations with his patients undergoing treatment in a private sanatorium. He has found that these patients generally obtain their knowledge concerning the disease from "quack periodicals," and having in view the desirability of supplying information which would be helpful to them he decided to publish this book, and hence his remarks are more especially addressed to them.

Any effort to supply the real truth about consumption, its infectious nature and how the danger of infection can be reduced to a minimum, will be welcomed, and this volume sets forth most useful information for patients undergoing sanatorium treatment.

The short chapter on "Heredity" might be read with advantage by many who have not studied the subject, since consumption is almost universally regarded by them as being a disease of hereditary origin.

Dr. Diver explains a good deal of elementary physiology in his book. He especially refers to it in connexion with the digestive functions, and rightly points out that "stuffing" the patient with food, as was considered necessary when sanatorium treatment was first introduced, is an undesirable practice.

The times and method of taking the temperature are fully discussed, but it is not understood why it is necessary for the temperature to be taken in the rectum—an unpleasant procedure under ordinary circumstances and an inconvenient one when the patient is not confined to bed. It is the relative temperature that is required, and this is pointed out by the author himself when he lays down that "the physician will study the relative temperature and his opinion will be based upon a summary of the conditions which obtain in the individual case before him."

The advice given in this book is excellent, and if the Belle Vue Sanatorium was organized on the principles laid down, that institution must have been of undoubted value.

F. H. T.

PALUDISM. No. 1, 53 pp., No. 2, 117 pp. Being the Transactions of the Committee for the Study of Malaria in India. Simla Central Branch Press.

This publication represents the first results of the first really serious effort on the part of the Indian Government to deal with the study and prevention of malaria in India. An enormous amount of good work has, of course, been done in that country by individual workers, but up to the present there have been no means of correlating and directing the investigations on a uniform plan. That this should have now been organized is a matter of congratulation to all who have the interests of India and of our other tropical countries at heart.

The organization is the outcome of the Malaria Conference held at Simla in October, 1909, and consists of Provincial Committees for the collection of records and the control of the work of investigation and prevention in the Provinces; a Central Scientific Committee composed of skilled workers for the carrying out of research work and instruction; and a General Committee consisting of the Central Research Committee and of delegates from the Provincial committees, which meets once a year in Simla for the discussion of the work already done and of plans for further work.

Apart from the research work the Central Scientific Committee undertakes the formation of type collections of mosquitoes, the establishment of a library and museum at Kasauli for the use of workers, the direction of periodic classes of instruction in malaria, to which officers from the various provinces will be delegated, and the publication of a Bulletin containing the results of the work done and accounts of publications by workers in other parts of the world. With such an organization, and with such work, one may confidently hope that it will not be long before there is seen a definite effect in the reduction of the morbidity from malaria in India, and that it will once more be borne in upon the minds of our lay administrators that there is no other method of spending money which yields such a return as that given to the furthering of well-directed scientific research. This has already been exemplified in the results of the work on Malta fever and typhoid fever in our Army, concerning which it would be no exaggeration to say that the saving resulting from the money spent on research represents a return of many hundreds per cent.

Turning to the articles in the present numbers: Part I. commences with a history of the origin of the anti-malarial organization sketched above, then comes a series of suggestions as to points which require elucidation. Christophers has a very interesting and suggestive article on the use of statistics in the study of malaria, and James describes a new anopheline—*Christophersi halli.* The part ends with a number of abstracts from recent literature on malaria.

The second part commences with a record of the progress which has been made with the organization and of the work which has been done since the publication of the first part. Christophers describes a method for predicting an epidemic of malaria, depending on a calculation from the rainfall and the average prices of foodstuffs in the districts concerned. An abstract of a paper by MacGilchrist on the absorbability of quinine and its salts follows; one notes that the author finds that quinine by the mouth, even in a full stomach, is more readily absorbed than when given hypodermically in the usual dilutions, but when it is well diluted, say to 1—150, it is more quickly absorbed when given hypodermically than when given by the mouth. Another abstract is from a paper by Sir David Semple on the relation of injections of quinine to the occurrence of tetanus; he confirms the results of Vincent published some years ago that tetanus following the injection of quinine is due not to the injection of tetanus germs with the medicine, but to the fact that the quinine produces a necrotic area in which tetanus spores already present in the body are able to grow out and produce their toxin. He concludes that one is not justified in giving injections of quinine without a preliminary prophylactic injection of anti-tetanic serum. Among other papers are one by Bentley on the *Nyssomyia Rossi* and malaria, another by the same author on the seasonal malarial infection of *Neocella Stephensi* in Bombay, and a paper of notes on mosquitoes by Christophers, which should be very useful to workers.

From this it will be seen that the publication is one which promises to be extremely useful to all workers in malarial countries, and especially in India.

W. S. H.

THE MANUAL FOR THE CADETS OF THE O.T.C. JUNIOR DIVISION. Compiled by G. T. Hankin, Captain, Officer Commanding King's College School Contingent, Wimbledon. London: Harrison and Sons. 1911. Second edition, revised 1911. Pp. xii. + 306. Price 1s.

This manual is a compilation containing in a portable form the portions of the official text-books which are prescribed for cadets who desire to take the certificate (A) examination. It contains no original matter. These text-books are King's Regulations, 1908; Infantry Training (with amendments), 1908; Field Service Regulations, Part I., 1909; Field Service Pocket-book, 1908; Musketry Regulations, Part I., 1909. The manual contains the syllabus for certificate A for infantry, in which cadets of the Junior Division O.T.C. may be examined, and with this as a guide gives, in sequence, the extracts from the text-books. Its merit consists in its portability and cheapness, embodying as it does in one small volume the information which would otherwise have to be sought in five.

H. E. R. J.

YELLOW FEVER AND ITS PREVENTION. By Sir Rubert W. Boyce, M.B., F.R.S.; Holt Professor of Pathology, University of Liverpool; Dean of the Liverpool School of Tropical Medicine. London: John Murray. 10s. 6d. net.

There are three fly-borne fevers caused by virus which can pass through the Pasteur-Chamberland filter—yellow fever, dengue, and sandfly fever. At their onset they are all alike in the attack, being ushered in with intense frontal headache, intolerance of light, suffusion of conjunctivæ. The face is flushed and the features are swollen. There are severe pains in the back and legs; vomiting often occurs. The pulse is slow though the temperature may be high. The leucocytes are diminished in number. It is the subsequent progress of the case alone which will permit of a clinical diagnosis. In yellow fever usually the conjunctivæ will have assumed a yellowish tint by the third day, the first sign of general jaundice; hæmorrhages from the mucous membranes will be noted; the vomit will change from bilious to coffee-ground. In dengue, the loin and joint pains will gain in severity; a rubeoloid eruption appears on the fifth or sixth day. In sand-fly fever the symptoms are milder and subside about the third day. Now in all epidemics of yellow fever and dengue there are attacks which abort at an early period, before the manifestation of the distinguishing signs, so that their clinical diagnosis is impossible. Hence it often happens that no name can be given to an epidemic until the occurrence of severer instances of the infection, the symptoms of which conform to text-book descriptions. We know that during outbreaks of enteric fever many of the mild cases escape recognition, and are called "pyrexia of uncertain origin," "influenza," &c. The same applies to yellow fever. In the year 1881, Finley induced slight febrile disturbances in seventeen persons by submitting them to the bites of stegomyias fed on yellow fever patients. The American Commission repeating these experiments, caused typical yellow fever in some individuals, but in one the stings of the infected stegomyias gave rise to pyrexial symptoms, indistinguishable from sand-fly fever, that is, there was no jaundice, and there were no hæmorrhages or black vomit. Here we have experimental proof that yellow fever virus may originate an illness which far from tallies with the classical description of the disease. In the year 1904, Marchoux and Simond drew attention to the fact that such aberrant attacks played a great part in the propagation of the fever. Epidemics vary greatly. Simond, Aubert, and Noc have reported outbreaks in which the abortive and ambulatory cases predominated, in which icterus and other characteristic symptoms were absent. Therefore, if fevers, with indefinite or masked clinical signs, occur in parts where the stegomyia abounds, ruthless extermination of this insect-pest is demanded. This is the thesis of this interesting work now before us. The author brings forward overwhelming evidence to the effect that the neglect to recognize yellow fever, even in its fully-developed forms, is widespread, though the stegomyia endeavours to its utmost to attract attention to itself by its persistent onslaughts. He gives many lamentable instances of this wilful blindness to obvious facts. Several of the chapters have appeared already in the columns of the *British Medical Journal.* There are some signs of hasty compilation which we hope will be removed from the next edition. We note that it is stated that the statistics of Rio are given from the year 1896 to the present time, yet the last year included in the table is 1904. The subsequent history of this city is instructive, for in the year 1905 there was a recrudescence of yellow fever, 608 attacks and 289 deaths. This was succeeded by a rapid fall in the following years. In 1908 there were four deaths only among a population of 824,000 inhabitants. In 1909 there was one case which ended in recovery.

We think that the experimental work of Parker, Beyer, and Pothier, of Marchoux, Salembini, and Simond, who confirmed and extended the American experiments, is worthy of fuller treatment, while reference to the discredited theories of Sanerelli, Sternberg, Durham, and Myers might be omitted.

There is a full account of the measures which are effectual in the destruction of the stegomyia.

The volume will commend itself to all residents in the Tropics, medical and lay, since the author rightly regards personal education as a very great factor in the prevention of disease.

C. B.

Current Literature.

Experimental Syphilis in Rabbits.—Uhlenhuth (*Deutsch. med. Woch.*, April 13, 1911) first attempted to inoculate rabbits with syphilis in 1889. His endeavours to cause a general infection by injecting human virus into the rabbit's veins failed. The rabbit's testicle, however, offers a better avenue of invasion. He obtained local manifestations in ten out of seventeen animals infected in this manner. The virulence of the *Treponema* became increased. Making use of intravenous injections of this exalted virus, he induced secondary symptoms in young rabbits. After five or six weeks, swellings on the nose and tail, ulcerations about the face and base of ears, eye affections, paronychia, and finally ulcers over the whole body were observed. *Treponemata* were found in the blood. The lesions would disappear but were liable to recur. Atoxyl acted as a curative agent. Immunity did not arise, nor were antibodies elaborated. With the same virus he induced constitutional syphilis in apes.

C. B.

A Serious Outbreak of Foot-and-mouth Disease due to Contaminated Small-pox Vaccine Virus. (Twenty-sixth Report, Bureau of Animal Industry, U.S.A.)—In November, 1908, cases of contagious foot-and-mouth disease were reported in a herd of cattle near Danville, Pa., and within a few days cases were discovered in other counties in Pennsylvania, in the State of New York and in the States of Michigan and Maryland. A prompt quarantine was declared, search was made for infected animals and localities, all diseased and exposed animals were slaughtered and buried, and all premises occupied by them disinfected. In this work 572 employees of the Bureau of Animal Industry, including 159 veterinarians, were occupied. These inspectors made 108,683 visits to premises in twelve States, and the total number of animals inspected, including reinspections, was 1,565,699. Altogether 3,636 animals, valued at $90,033 were slaughtered and the quarantine was finally removed on April 24, 1909.

The origin of the outbreak was traced to calves that had been used in propagating small-pox vaccine in an establishment at Detroit, Mich., and investigation proved that the small-pox virus of this establishment was contaminated with the virus of foot-and-mouth disease. This virus was obtained from Japan in 1902, and it appears probable that it was contaminated before introduction and that the outbreak of foot-and-mouth disease in New England in that year was due to this source. The infected calves, after having been used for the propagation of vaccine, were sent to the Detroit stock-yards, where they remained for two hours, before being taken to a farm near the city. Four days later the same pens were occupied by healthy cattle which were afterwards shipped to Danville and other places where the outbreak subsequently occurred.

Steps were taken by the Public Health Department to destroy all this contaminated virus and to examine every strain of vaccine virus on the American market with the result that they were able to give an assurance that no vaccine virus contaminated with the virus of foot-and-mouth disease remains on the market.

The cost of eradicating the outbreak was over $400,000 of which about three-quarters was met by Federal appropriations.

C. H. S.

The Score-card Method of Dairy Inspection and the Extra Cost of Producing Clean Milk.—Whitaker of the United States Bureau of Animal Industry has an article in the Twenty-sixth Annual Report of the Bureau on the extra cost of producing clean milk, which is of considerable interest to sanitarians, and which incidentally describes the "score-card" method of inspection of dairies.

Anyone who has had to read sanitary reports on premises of any kind has felt the difficulty of estimating the precise value of vague terms; by this method all these vague terms are reduced to figures, and as each item has a very small score for perfection, there is not much room for personal variations, and in many of the items the personal element is entirely excluded, and a precise value is laid down for the different grades up to perfection.

A study of the card will show one at once that there are very few dairies in this country which would obtain a score of 100, and the same is the case in America; probably only a few private dairies run for pleasure would obtain a score of over 95, and it is to be understood that, with few exceptions, modern sanitary requirements are practically met by a score of 70, or thereabouts, although it is hoped that ambitious dairymen will strive to get into the eighties or above, and that they will find appreciative customers willing to pay an extra price for milk produced under such superior circumstances. In discussing the cost of improvement, the writer considers that any dairy should already have been able to score 42 points, and considers the cost of improvement up to a score of 70.

A study of the card, reproduced herewith, will show the points on which stress is laid; the writer considers that a full score should be obtained for the heading "Cows" in the first column, and at least half score for their cleanliness. Three points for light and 2 for ventilation should be obtained under the heading "Stables" in the first column, even if no points are obtained under the other subheads for construction and location, and 8 points should be obtained under the same heading in column 2. Clean, but not necessarily white, suits for milking give an extra point, thorough washing of utensils and inverting them in pure air give 4 points, milking with clean, dry hands gives 3 more, and another 3 should be obtained for prompt removal of the milking and for cooling. This gives a total of 42, which should be the lowest rating of ordinary dairies, and should be obtained before the dairy is allowed to sell milk.

It is stated that five minutes work on a cow a day would raise the score for cleanliness of cattle from 4 to 7, an additional five minutes per cow should keep the stable and milk-house clean.

In all it is estimated that, in a fifteen-cow dairy, to raise the score from 42 to about 70, there may be an added expense of 5 cents per cow per diem for labour, plus, in extreme cases, 5½ cents for new and additional equipment; and if we add 5 cents more to remunerate the

DAIRY

Score for equipment............

Equipment		Score	
		Perfect	Allowed
Cows.			
Health		6	..
Apparently in good health	1		
If tested with tuberculin once a year and no tuberculosis is found, or if tested once in six months and all reacting animals removed	5		
(If tested only once a year and reacting animals found and removed, 2.)			
Comfort		2	..
Bedding	1		
Temperature of stable	1		
Food, clean and wholesome		2	..
Water		2	..
Clean and fresh	1		
Convenient and abundant	1		
Stables.			
Location of stable		2	..
Well drained	1		
Free from contaminating surroundings	1		
Construction of stable		4	..
Tight, sound floor and proper gutter	2		
Smooth, tight walls and ceiling	1		
Proper stall, tie and manger	1		
Light: 4 sq. ft. of glass per cow		4	..
(3 sq. ft.. 3; 2 sq. ft., 2; 1 sq. ft., 1. Deduct for uneven distribution.)			
Ventilation: automatic system		3	..
(Adjustable window, 1.)			
Cubic feet of space for cow: 500-1,000 ft.		3	..
(Less than 500 ft., 2; less than 400 ft., 1; less than 300 ft., 0; over 1,000 ft., 0.)			
Utensils.			
Construction and condition of utensils		1	..
Water for cleaning		1	..
(Clean, convenient, and abundant.)			
Small-top milking pail		3	..
Facilities for hot water and steam		1	..
(Should be in milk house, not in kitchen.)			
Milk cooler		1	..
Clean milking suits		1	..
Milk Room.			
Location of milk room		2	..
Free from contaminating surroundings	1		
Convenient	1		
Construction of milk room		2	..
Floor, walls and ceiling	1		
Light, ventilation, screens	1		
Total		40	..

SCORE CARD.

Score for methods............ Final score............

Methods		Score	
		Perfect	Allowed
Cows.			
Cleanliness of cows		8	..
Stables.			
Cleanliness of stables		6	..
Floor	2		
Walls	1		
Ceilings and ledges	1		
Mangers and partitions	1		
Window	1		
Stable air at milking time		6	..
Barnyard clean and well drained		2	..
Removal of manure daily to field or proper pit (To 53 ft. of stable, 1.)		2	..
Milk Room.			
Cleanliness of milk room		3	..
Utensils and Milking.			
Care and cleanliness of utensils		8	..
Thoroughly washed and sterilised in live steam for 30 minutes	5		
(Thoroughly washed and placed over steam jet, 4; thoroughly washed and scalded with boiling water, 3; thoroughly washed, not scalded, 2.)			
Inverted in pure air	3		
Cleanliness of milking		9	..
Clean, dry hands	3		
Udders washed and dried	6		
(Udders cleaned with a moist cloth, 4; cleaned with a dry cloth at least 15 minutes before milking, 1.)			
Handling the Milk.			
Cleanliness of attendants		1	..
Milk removed immediately from stable		2	..
Prompt cooling (cooled immediately after milking each cow)		2	..
Efficient cooling: below 50° F. (51 to 55°, 4; 56 to 60°, 2.)		5	..
Storage: below 50° F... (51 to 55°, 2; 56 to 60° 2.)		3	..
Transportation: iced in summer (For jacket or wet blanket allow 2: dry blanket or covered wagon, 1.)		3	..
Total		60	..

owner for his extra care and vigilance, there will be an extreme increase of 15½ cents. This is equivalent to an increase of from 1½ to 3 cents (¾d. to 1½d.) a quart of milk produced. The writer ends by saying that the propaganda for the production of cleaner milk must be accompanied by an educational campaign among consumers, for a realization of the superior safety of the better article and an appreciation of its greater value, expressed in dollars and cents. The truth of this statement is at least equally evident in this country, where we are but too apt to neglect the business side of public health. An attempt to realize this will be found in the National Insurance Bill, recently introduced into Parliament, in which it is proposed to penalize local authorities by whose neglect the cost of invalidity has been increased.

C. H. S.

Eradication of an Outbreak of Surra in Indian Cattle Imported to the United States.—Mohler and Thompson of the United States Bureau of Animal Industry, give in the Twenty-sixth Annual Report a history of the importation of the Zebu or Brahman cattle of India into southern Texas. It had been found as a result of importations about thirty years ago that the Zebu when crossed with the American domestic cattle produced a progeny which was well suited to the climate and conditions of the Gulf Coast section of the country and which appeared to be little affected by ticks and other insects. The original Indian strain had deteriorated in thirty years and in 1906 the Government were asked to sanction the importation from India of a fresh consignment of animals.

The importation was permitted on condition that the cattle should be inspected in India by a veterinary inspector of the Bureau who should proceed to that country at the importer's expense, that all animals should be tested by animal experiments, that no animals should be accepted from any locality known to be infected and that if any infectious disease should be discovered after the animals had been collected for shipment the whole consignment should be considered to be infected and should be rejected.

Forty-six bulls, one heifer and two calves of seven different breeds were purchased in different parts of India, and were collected at Poona where microscopic examinations of their blood were made on two occasions with negative results, but no animal experiments were possible. Owing to the reported existence of rinderpest in Western India the animals were inoculated against this disease. The animals were apparently sound and healthy and were shipped from Bombay on April 27, the ship then proceeded to Karachi, where it remained for about a week, and then to Hamburg; here the animals were transhipped and arrived at the port of New York on June 16, 1906. On arrival they were quarantined on an island in a specially constructed corral.

While the animals were in quarantine it was decided to make rabbit inoculations from the blood of each beast. Five to eight cc. of blood were removed from the ear of each Zebu and received into sterile bottles containing sufficient citrate solution to prevent clotting; 2 cc. of this blood was injected subcutaneously into a rabbit on the inner side of the thigh. Three of the rabbits showed a marked rise of temperature in a few days and *Trypanosoma evansi* was demonstrated in the blood of one on the ninth, and in that of two more on the tenth day.

It was decided to kill and burn the three beasts shown to be infected and to make repeated blood tests of the remaining animals until the herd should be absolutely free from infection.

At this time the corral was swarming with biting flies, including *Tabanus atratus* and other *Tabanidæ* and *Stomoxys calcitrans*; it was decided to floor and screen the corral in the hope of keeping out these flies and saving at least a portion of the valuable herd. This was done and by means of fly-papers all the *T. atratus* were caught or destroyed. A second set of inoculations was made on July 31, and seven more animals reacted; these animals were at once destroyed, as were eight more found to be infected up to August 15. On this latter date each of the remaining animals was housed separately in a specially built fly-proof stable. Subsequent tests made on August 31, September 7, 13 and 20, and October 10, 19 and 24, proved negative in every case. On November 14, severe frosts having occurred and all flies and mosquitoes having disappeared, the remaining thirty-three animals were released from quarantine and proceeded to their destination in Texas.

The writers believe that three animals were infected whilst the ship was at Karachi, where a number of camels were close to the dock and it was noticed that *T. tropicus* was present on the cattle. They consider that the subsequent cases were infected from the first three, during the first part of the quarantine period, by bites of *T. atratus*, the black horse-fly, or gadfly, which was very numerous and very vicious in its assaults upon the cattle. These flies were entirely excluded from the cattle from July 27, while other species were not entirely eliminated until August 15.

The importance of preventing the importation of animals infected with surra into America, where there are flies capable of spreading it far and wide, is well shown by this outbreak. It may also be noted that in only two out of the eighteen cases were the trypanosomes found microscopically in the Zebus' blood. C. H. S.

The Bacteriology of Puerperal Fever.—H. Schottmüller (*Münch. med. Woch.*, April 11, 1911, p, 787) directs attention to the study of the anaerobic bacteria present in the blood and discharges in puerperal fever. He finds that the anaerobe, *Streptococcus putridus*, causes a more malignant infection than the ordinary streptococci. Moreover, they often occur together. The anaerobic organism, the *Bacillus emphysem. Fränkel*, may also occasion a fatal septicæmia. His methed of anaerobic plate cultures is simple. He uses deep Petri dishes; in the lower he puts a layer of absorbent cotton wool to receive the pyrogallic acid and caustic potash; in the upper is the solidified agar. The two plates are then sealed together with plasticin, which effectually excludes air.

Semon (*Berl. klin. Woch.* April 3, 1911, p. 634) has made blood cultures in eighty-six cases of puerperal fever. In twelve, growths were obtained: *Streptococcus hæmolyticus* in eight, four of which died; staphyloccus in four, two of which ended fatally. The absence of bacteria in the blood is a favourable prognostic sign, for of the seventy-four patients whose blood proved to be sterile only two succumbed.

C. B.

Pure Culture of Treponema Pallidum.—Hoffmann (*Zeitschrift f. Hyg.*, February, 1911, p. 28) states that he has inoculated many thousands of tubes with syphilitic material in order to find the best conditions for the growth of *Treponema pallidum.* Schereschewsky was the first to succeed in obtaining cultures by inserting fragments of infected tissue in tubes of horse serum which had been solidified by prolonged heating at 60° C., and incubating at 37° C. anaerobically. Success is infrequent, and when attained the contaminating micro-organisms are a hundred times as numerous as the Treponemata. Mühlens obtained a pure culture from such a mixture by inoculating into two parts agar and one part horse serum incorporated together at 50° C. After eight days of anaerobic incubation at 37° C. the colonies of the spirochætes appeared in the depths of the medium as slight opacities. Hoffmann has been successful in a few instances making use of this method, but admits its difficulty and uncertainty. It is easier to obtain subcultures than to start the growth. Plain agar, or broth inoculated with a spore-bearing ærobe, were of service for this purpose. The addition of defibrinated horse, ox, sheep, or rabbit blood to bouillon gave a like result. Very long and motile forms of the Treponema occurred in these latter media. Cultures of the Treponema can withstand the action of a 10 per cent. solution of antiformin for twenty-four hours.

Unfortunately, the evidence that these growths are, without doubt, the *T. pallidum* is incomplete, since they are non-pathogenic to the lower animals. Nevertheless, the serum of four apes after inoculation gave positive Wassermann reactions, and emulsions of the organism behave identically with syphilitic liver extracts as antigens in Wassermann's test.

C. B.

Salvarsan in Optic Neuritis.—Igersheimer (*Münch. med. Woch.*, April 11, 1911, p. 821) reports two cases in which optic neuritis cleared up after an injection of salvarsan. (1) A woman was infected in June, 1910. She received intramuscular injections of salvarsan in July and October. A month later severe headache came on, and sudden loss of sight in her right eye; optic neuritis and choroiditis were found. Improvement of vision began after an intravenous injection of 0·4 gm. of salvarsan. As progress was somewhat slow, mercury also was administered. Vision was regained. (2) A woman developed optic neuritis of the left eye accompanied with retinal hæmorrhage, and white patches in the macula, a month after a second dose of "606." She was then given a third dose intravenously. The ocular signs began to subside in two days, and sight was improved from $\frac{1}{7}$ to $\frac{5}{7}$. (3) Choroiditis in a man, of fifteen months standing. He had been treated with mercury and iodides without benefit. His vision became markedly better shortly after 0·4 gm. of "606" administered by the veins.

Davids (*Münch. med. Woch.*, April 11, 1911, p. 811) records a case of severe iritis which occurred in a patient who had had "606" intramuscularly. Recovery rapidly ensued after a second dose given intravenously.

Falta (*Deutsche med. Woch.*, April 13, 1911) relates the history of two cases of neuro-retinitis which had arisen before the administration of salvarsan. The ocular lesions were not immediately removed by this remedy. Mercury and iodides were therefore given. He would have recourse to "606" only in those instances of specific eye diseases which resist other treatment.

Port (*Berl. Klin. Woch.* April 3, 1911, p. 633) has seen syphilitic optic neuritis disappear under the action of salvarsan in two instances.

Stuelp (*Klin. monatsbl. f. Augenheilk.*, March, 1911), has collected reports of 470 cases of specific eye affections treated with "606," which have been published in medical periodicals up to the beginning of February, 1911. C. B.

Paratyphoid Fever.—Rolly (*Deutsche med. Woch.*, April 13, 1911) reports an outbreak of paratyphoid fever caused by eating infected mincemeat. Thirty-five persons were attacked, twenty-nine of whom were seized with illness simultaneously. The paratyphoid A bacillus was the infecting agent in two, the paratyphoid B in all the rest. The clinical symptoms were indistinguishable from those of typhoid fever of a mild type. All the cases ended in recovery. Blood cultures were successful in ten. Moreover, the paratyphoid bacillus was obtained from the fæces of all, and in many continued for the first four weeks or more of convalescence. The serum in high dilutions clumped the paratyphoid B, whilst its effect on paratyphoid A and the typhoid bacillus was comparatively slight. C. B.

Autotherapy in Cirrhosis of Liver.—Sicard and Galup (*Bul. elémen. soc. méd. des. hop.*, 1911, No. 5) have succeeded in two cases in relieving ascitic distension of the abdomen by drawing off 300 to 500 cc., and re-introducing the fluid into the patient's veins. C. B.

On the Action of Anti-Typhoid Serum.—W. Lenard (*Zeitschrift f. Hyg.*, February, 1911, 689) has repeated Pfeiffer's experiments. He has inoculated guinea-pigs intraperitoneally with typhoid bacilli and anti-typhoid serum, and has killed the animals at intervals of fifteen minutes. Pfeiffer supposed that the destruction of the bacteria which occurs was caused solely by the fluids poured forth into the peritoneal cavity. Lenard, however, confirms Grüber's results, and finds that the bacilli become adherent to the omentum and peritoneum, where they are phagocyted. They may be discovered in these sites at a time when the peritoneal fluid is sterile. Metchnikoff observed that a preliminary intraperitoneal injection of such various substances as sterile broth, blood, urine, or nuclein, would protect animals from an otherwise fatal inoculation twenty-four hours later. Lenard by similar means secured the survival of animals which had received ten lethal doses of typhoid bacilli in the abdominal cavity. It is therefore obvious that this preparation of the peritoneum has evoked protective agencies which can combat an infection without the aid of specific antibodies. Nevertheless, if in place of the above substances anti-typhoid serum be introduced into the abdominal cavity, the proportion of protective materials elaborated is much greater. These are of the nature of thermolabile opsonins and bacteriolytic bodies. Lenard soaked threads in mixtures of typhoid culture and antityphoid serum, and of typhoid culture and normal serum respectively, and inserted them in skin pockets in mice. The specific serum caused an earlier and greater exudation of lymph and leucocytes than the normal serum. He concludes by stating that though the antityphoid serum contains anti-bacterial substances, yet its chief action is exerted in bringing about an intense leucocytosis and a rapid and abundant outpouring of natural antibodies at the site of inoculation.

C. B.

Etiology of Endemic Goitre.—McCarrison (*Annals of Tropical Medicine*, vol. v., p. 1) reports the results of further experiments on the causation of goitre in man. Ten subjects out of thirty-six who swallowed the suspended matter of a goitre-producing water developed goitre; in thirty-one cases where the water was boiled before swallowing no goitre occurred. Filtration of the water through a Berkefeld filter removed the goitre-producing material, and three men who had a goitre already improved greatly when they drank filtered water from a suspected source for fifty-five days. The article is illustrated by photographs of the experimental cases. W. S. H.

Leprosy.—Wise, in a report on the Nastin treatment of leprosy at the Mahaica Leper Asylum, British Guiana, reports the results of Nastin treatment in 135 cases. In most cases there was an improvement in the sense of well-being which has persisted. As to the immediate results, there was general severe febrile reaction in 2·7 per cent of cases, excessive ulceration in 14·4 per cent, and marked wasting in 10·3 per cent; possibly the last two effects were due to an increase in bacteriolysis in the nodules, of which Dr. Wise considers there was definite evidence. The Nastin, if it has any curative influence, seems to act by increasing the natural tendency of the leprotic nodules to ulcerate; and wherever the nodules are at all extensive, this ulceration produces a severe drain on the system, with wasting, and may eventually prove fatal. In a great many cases the patients seemed to develop a resistance to the Nastin, as is shown by the final results—viz., 31 per cent showed no change, 48·6 per cent began to improve and then became stationary, 20·4 per cent showed progressive and slow improvement. In three cases out of the 135 the improvement was such that it approximated to a cure. The paper is accompanied by detailed accounts of many of the cases and by photographs.

W. S. H.

Destruction of Mosquitoes in Japan.—Dyé and Jumentie (*Le Caducée*, No. 7, 1911) report the following information received from the Trappists in Japan:—

(1) Artemisia plants, one day after being cut, are placed on a hot stove along with some pine twigs; the fumes speedily drive away any mosquitoes.

(2) Chrysanthemum flowers (red or white) are dried, crumbled up and sprinkled in a brazier containing glowing charcoal. If the windows and doors are kept closed for a short time, all mosquitoes in the room are killed. C. E. P.

Two Cases of Actinomycosis — Oberarzt Brünig und Stabsarzt Grunert (*Deut. Militärärzt. Zeitschrift*, May 20, 1910).—The first case reported was in an infantryman, who had, however, been employed as a groom. The affection began as a painless swelling of the left side of the face. The swelling increased in size and became painful, especially when any attempt was made to open the mouth. Local fomentations were applied. About a week after admission fluctuation was detected at one spot; an incision was made, and about a tablespoonful of sticky pus escaped. The microscope showed this to contain quantities of the ray fungus. The cavity was packed with iodoform gauze; the wound healed in three weeks, but a fortnight later he had to be readmitted, as a second focus had formed. This was similarly treated. The jaw bones were not affected, the disease being limited to the parotid gland. Potassium iodide was given internally.

In the second case, a field gunner, a painless tumour slowly formed at the outer side of the left biceps. On incising this a wall of matted tissues was cut through, and a cavity containing viscid pus was opened. The cavity extended down to the periosteum of the humerus and high up under the biceps muscle. The wound healed nicely in about a fortnight. Later on, the left shoulder-joint became painful and stiff, and a swelling appeared which gradually extended towards the armpit. A large abscess cavity was opened, and the pus found to contain the ray fungus. During the following year six further abscesses were opened on different occasions in the deltoid and pectoral muscles. Potassium iodide was given internally. This man was bitten in the left arm while cleaning his horse two months before his first admission to hospital, but as the resulting wounds were superficial he treated them himself and did not report sick. Repeated examinations of the horse failed to detect any signs of actinomycosis. C. E. P.

The Position of Nursing Sisters of the German Red Cross Society in relation to the Army in War. By Generalarzt Dr. Werner (*Das Rothe Kreuz*, February 5, 1911).—This paper contains the substance of a lecture delivered at the annual meeting of the Voluntary Aid Nursing Societies at Munich, October, 1910. The author points out that the mere fact that a nursing sister belongs to a society does not confer any privilege in the matter of being employed with the army in war. The employment of sisters is arranged by the army medical department through those societies which have been registered for the purpose by the government.

During war, nursing sisters will not be employed in the area of active operations, but only on the lines of communication or in the home territory. The nursing sisters must undertake to serve for a period of three months, although, as the law at present stands, it appears that there is no legal obligation to do so, the moral obligation would, however, be quite sufficient to ensure their carrying out this duty.

Nursing sisters employed on the lines of communication become subject to military law, and fall under the command of the senior medical officer on the spot. It is therefore desirable that the societies should give them some instruction on the scope and penalties of military law. Voluntary aid societies are not permitted to carry on nursing functions independently of the State, but must subject themselves to the military authorities. The imperial delegate is the administrator, and immediate superior of all voluntary aid in the field, but in all nursing duties the voluntary aid personnel falls under the command of the senior medical officer. On being relieved from any duty, a report as to their efficiency will be entered in their service books. Any nurse considering herself aggrieved has the right to appeal for redress to higher authority. During their period of service with the army in the field, the voluntary aid personnel is entitled to free board, lodging and pay in accordance with the warrant for pay in war; a nursing sister's pay is 30s. per month. If disabled, they are entitled to free treatment, and sick pay at the rate of 9s. per month. In the event of becoming incapacitated, they receive compensation as laid down for the subordinate personnel of the German army. The rate varies according to the degree of disability; thus, £2 14s. per annum is granted in the case of incapacity to the extent of one-tenth of the earning power; while for total incapacity compensation is allowed at the rate of £27 per annum, with an additional £9 per annum if the disability is due to active service; in the case of the loss of a limb, further compensation up to the extent of £16 3s. per annum may also be granted. Military pensions will not be paid in addition to civil pensions for disability derived from the State, but they will not be prejudiced by the fact that the recipient is also drawing compensation from a private insurance society. In the event of death, the relatives are entitled to compensation from government on a scale laid down by law.

C. E. P.

Prevention of Malaria.—Generaloberarzt Professor Dr. Stendel writes in the *Arch. f. Schiffs und Tropen Hygiene,* Bd. xv., No. 4, calling attention to Stabsarzt Vorwerk's investigations into the habits of the anopheles in the Cameroons. It appears that in this district during the dry season, *i.e.*, for about three months of the year, the anopheles is seldom seen. Vorwerk found that they hibernated in the native huts; of 180 mosquitoes captured during this period, in native huts, 177 were anophelines. Stendel, therefore, suggests that a systematic fumigation of all huts during this season would have the effect of reducing the number of anopheles to a minimum, and so very largely decreasing the incidence of malaria during the ensuing wet season. C. E. P.

The Medical Services during the Spanish Campaign in Morocco, 1909. (A lecture by Oberstabsarzt Steiner, *Militärarzt,* No. 6, 1911.)—Steiner gives a short account of the medical aspects of this campaign. At the commencement of hostilities the Spanish forces consisted of the brigade in garrison at Melilla, the total strength being roughly 7,300 men; it included one ambulance section. By the middle of September the reinforcements had raised the strength of the expeditionary force to 43,000 men: the navy also furnished two divisions of ships which supported the military operations along the coast.

Supplies, including water, were carried on pack mules; each battalion also had a galvanised iron water-cart drawn by six mules. The sandstorms in summer and tropical rains in autumn caused much suffering among the troops. At first the troops wore uniforms made of white cotton striped with blue; cloth uniforms were supplied at a later date. No tents were provided. The men wore either boots or sandals according to fancy. Spectacles were provided to protect the eyes from dust. Each man carried three reserve rations and a first field dressing.

The tribesmen attacked the workmen on the railway early on July 9, 1909. A mixed force of 2,300 men was sent out to drive them off; it succeeded in doing so, and took up a fortified position to protect the railway; the Spanish losses were two killed and twenty-six wounded. Fighting continued at intervals and the Spanish losses were: July 18, killed 15, wounded 30; July 20, killed 33, and wounded 60; July 23 and 24, killed 2 staff and 8 field officers, 46 men, wounded 12 staff and field officers, 215 men. During this peried only the regimental medical personnel was available.

On July 27, General Pintos, who had just been reinforced by the 1st Rifle Brigade from Madrid, attacked the Gurugu mountain. His force of about 6,000 men was surrounded in a defile, and had to retire. The Spanish losses were: killed, General Pintos, 5 staff officers, 16 field officers and 166 men; wounded, 38 officers and 564 men; the casualties were thus roughly 13 per cent of the force. To deal with these there was only the regimental medical establishment. Wounded able to walk made their way back to Melilla, those unable to do so were brought in next day on the railway or supply wagons. The military hospital in Melilla was only equipped for 250 patients, and improvised accommodation of all sorts had to be hurriedly provided.

On September 20, General Tovar's division invaded the Beni Sikar territory, and after severe fighting captured the villages of Jatel and Taxdirt. On September 22, this division co-operated with General Sotomayer's from Melilla in the capture of Suk el Had.

During these operations a field ambulance accompanied the force, but seems to have been poorly provided with means of sick transport. On September 20, the casualties were 4 officers and 20 men killed, 83 men wounded. The regimental aid-posts worked well, but the field ambulance could not get nearer than Fort Rostrogordo, five miles from the scene of the action. The only routes between the battlefield and field ambulance were bridle-paths of the roughest kind. A few cacolets were available, but no litters. Most of the wounded had to be brought in by hand carriage; ten men were required for each stretcher, and to provide this number of bearers a regiment of the reserve brigade was ordered up. In spite of this arrangement many of the wounded were only brought to the dressing station on the day following the engagement. From the dressing station patients were forwarded to the hospitals in Melilla by means of ambulance wagons and a motor ambulance car graciously provided by the King.

Many minor engagements continued to take place.

On September 30, two Spanish brigades attempted to reach Suk el Jemis, but encountered determined opposition in which hand-to-hand fighting was frequent. They had to retire to Seluan with a loss of 1 general, 3 officers and 38 men killed, 16 staff and field officers and 233 men wounded. During the retirement it was not possible to attend to the wounded. At Seluan there was not sufficient hospital accommodation for the wounded, and the bulk of them had to be sent on to Melilla.

On October 18 the rains set in with a tremendous downpour; the camp was flooded, a large quantity of stores was lost, and the troops suffered intensely. At the same time the natives began a series of night attacks. The weather and local conditions made the work of the medical services very heavy and difficult.

Under the conditions it is not surprising that the health of the troops began to suffer. The hospitals were overcrowded and a regular evacuation service to Spain had to be established. By the beginning of November, 565 wounded and 4,000 sick, i.e., nearly ten per cent of the expeditionary force, had been evacuated to the hospitals in Spain.

In Melilla a chemical and bacteriological laboratory was established. Water sterilizers, both wheeled and for pack transport, were supplied to the troops. The sick were sent by ordinary mail steamer to Spanish ports.

C. E. P.

Correspondence.

THE ADMINISTRATION OF ETHER IN THE TROPICS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—In his communication to the April number of the Journal Captain Carruthers appears to be under some misconception. He states that it is doubtful whether operating rooms in the East are hotter than those of Europe. I had the pleasure of amputating through the thigh at Meerut in the middle of last hot weather, and had the curiosity to record the temperature of the theatre on that occasion. It was 104° F. As to what might be the quantity of ether required to anæsthetize a patient in such circumstances (if it could be done at all), one can only speculate, but it would manifestly be enormous.

This high temperature is due to the fact that the divisional operating theatre at Meerut, unlike most other buildings in India intended for work or habitation, has only got a verandah upon one side. The same is the case in Lucknow, and I have been informed by an engineer officer that this is the common pattern of an operating theatre in India. I have made an attempt to improve matters for a future generation by planting a couple of trees in a suitable situation to intercept the morning sun, but their growth will be manifestly a work of time. The "carefully cooled tropical operating room" spoken of by Captain Carruthers may exist in Ceylon, but has not yet made its way to the United Provinces.

I am, &c.,
F. J. PALMER,
Major, R.A.M.C.

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GRANULE SHEDDING IN *TREPONEMA PALLIDUM* AND ASSOCIATED SPIROCHÆTÆ.

By Captain W. R. O'FARRELL, R.A.M.C., and ANDREW BALFOUR, M.D.
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In the *Journal of the Royal Army Medical Corps* for June, 1911, one of us (A. B.) drew attention to the phenomenon of granule shedding in *Treponema pallidum* when this spirochæte is submitted to the action of salvarsan. A similar discharge of what are possibly spore-forms had been demonstrated in *S. granulosa penetrans* (n. sp.),[1] the fowl spirochæte of the Sudan. In its case the granule shedding occurs both naturally and under the influence of salvarsan. The occurrence of two cases of syphilis which came under the care of one of us (W. R. O'F.) has given us the opportunity of studying not only *T. pallidum* but other spirochætes associated with it in the primary lesion and we have found :—

(1) That granule-shedding in *T. pallidum* occurs before any treatment of the case is begun. It is, therefore, in all probability a feature in the life-history of the spirochæte. It is not so marked, however, as it is when salvarsan has been administered.

(2) That the same is true of other spirochætes associated with that of syphilis and is specially well seen in the case of *S. refringens.*

The following is an account of the cases mentioned :—

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[1] Balfour, A. (April 1, 1911), "The Infective Granule in Certain Protozoal Infections, as illustrated by the Spirochætosis of Sudanese Fowls."—*British Medical Journal.*

The material for examination was obtained from two cases of syphilis.

Case No. 1.—A soldier, aged 23, first seen on May 21, 1911. Infection had taken place about three and a half months previously. He presented a clinical picture of the advanced secondary stage of the disease and might well be described as a case of florid syphilis.

The trunk and limbs were covered with an ecthymatous rash, the scalp was involved and the hair showed signs of epilation ; the *corona veneris* was well marked.

The left tonsil was ulcerated and the whole fauces and throat injected. The superficial lymphatic glands were generally enlarged, and the left inguinal chain showed signs of suppuration.

The chancre situated on the glans was typically indurated, there was slight phimosis and a purulent balanitis was present.

In the folds of the groin the skin was moist and ulcerated in places. The skin between the toes was ulcerated and the big toes showed signs of commencing onychia.

Skin Lesions.—A microscopical examination of the serum from the scraped surface of one of the ecthymatous patches, when examined by the dark background illumination method, revealed the spirochætæ of syphilis in considerable numbers. Careful observation showed certain of the parasites to be shedding small, highly refractile granules, and these latter were present in the medium and exhibited a certain amount of what appeared to be true motility. No other spirochætes were present.

On May 22, 0·6 grm. of salvarsan was injected intramuscularly, suspended in olive oil, the intra-scapular muscles being the site selected.

Examination of the Skin Lesion.—Four hours after the salvarsan had been given the skin lesion was again examined. The treponemata were still present, but they now presented a much greater activity than formerly, undergoing what has been described by one of us (W. R. O'F.) as the dog-shaking movement, an action associated with a rapid discharge of granules from the cell membrane, the granules racing up and down the length of the spirochætes and finally being, as it were, flicked off from one or other extremity of the parasite.

It was noted more than once that the granule was shot out some little way into the medium and this sometimes served to distinguish the spirochæte granule from other granules, probably of the nature of hæmiconia present in the film. The *T. pallidum* is so fine and pointed at the ends that the closest observation was required to make certain of this granule discharge, but it was witnessed by both of us too often to leave any doubt in our minds as to what actually occurred. As a result of this granule shedding, certain of the spirochætes became very faint, lost their silvery appearance and eventually came to rest, either as wholly empty periplasts or as flattened cell membranes still containing one or two bright but motionless granules. Not infrequently such a granule was observed at one or other extremity as though the expiring spirochæte had just failed to expel it. There were also spirochætes which had been killed outright as an effect of the drug and appeared normal save for the lack of any motility.

May 23.—On this date blood-stained serum derived from the same skin lesion showed only free granules which from their size and motility appeared to be undoubtedly of spirochætal origin, blood granules, a few of these being the product of leucocytes, and small clumps of empty and motionless periplasts. No living spirochætes could be found.

May 24.—Only granules present. No signs of spirochætes or empty sheaths. On May 27, a similar result was obtained and by this time the skin lesion had greatly altered and was little more than a pigmented patch.

Examination of Chancre.—May 21. Before the administration of salvarsan a dark field preparation of slightly blood-stained serum from the lesion showed a vast number of spirochætes. *T. pallidum* was in evidence in well-nigh every field, but *Spirochæta refringens* was more common and exhibited great activity. In addition other species were present, some short and thick, others long and thin which we are unable to name; amongst them a *pseudo-pallidum* form was conspicuous, only to be differentiated from *T. pallidum* by its much greater motility and by the fact that its spirals were slightly better defined. As the result of prolonged observation it appeared to us that every one of the species of spirochætæ present was engaged in shedding granules. This phenomenon was of course best marked in the case of the large and comparatively stout *S. refringens*, the granules from which were brighter and larger, and possibly more active than those shed by *T. pallidum* and formed the majority of the varieties present.

May 22.—Four hours after the administration of salvarsan a film was put up and examined. The microscopic field presented an extraordinary appearance. The more active species of spirochætes were rushing about hither and thither, pausing, shaking themselves violently, and rapidly shooting out granules which went dancing about, the whole field soon becoming full of spirochæte granules mixed with hæmiconia and other granules derived from the blood, those from the leucocytes frequently having a vesicular appearance which served to distinguish them from the other forms. The *T. pallidum* participated in the granule shedding, but in the crowded field it was not so easy to observe them in action as it was in the case of *S. refringens.* Very soon, in addition to granules, motionless periplasts could be seen together with spirochætes which had evidently been killed outright by the salvarsan, and still presented the usual silvery cylindrical aspect, but showed no sign of motility. At a later period a tendency to clumping on the part of the empty sheaths was noticed.

May 23.—A film examined on this date showed only one living spirochæte, a *S. refringens,* which was engaged in granule shedding. The granules were in evidence, and there were clumps of empty periplasts, those of *T. pallidum* being clearly distinguished from those of the coarser spirochætes.

May 24.—No *T. pallidum* found and no clumps seen. A few thick, sluggish spirochætes were found and seen to be granule shedding. It is believed that these were derived from the accompanying balanitis, the secretion from which contained on this day, as formerly, numerous spirochætes—*S. balanitis ?*

May 27.—A scraping from the nearly healed chancre showed nothing but a few granules, the exact source of which it was impossible to indicate.

Stained Films.—The results obtained by the dark-field observations were confirmed by the examination of films stained by the Leishman and Giemsa methods, and by the Tamamato-Levaditi process. The Romanowsky-stained slides gave no evidence of granules either inside or outside the spirochætes. Possibly staining was not sufficiently prolonged, but there is no doubt that the free spirochæte granules have but a feeble affinity for polychrome methylene-blue and eosin.

Films treated by the silver process, on the other hand, showed up the granules well. The latter were stained a jet black and contrasted markedly with the brown or brownish yellow colour of the spirochætes which contained them, or near which they lay free. Not infrequently a spherical black granule was visible at one extremity of the parasite. The free granules are not always easy to distinguish from stain deposit, but some of the slides showed very little of the latter, and none of the dark spherical dots of precipitate stain, which closely resemble the infective granules.

Films made before and after the administration of salvarsan also showed spirochætes staining darkly through their whole length, these being parasites which had either not started granule shedding, or had been killed outright by the drug. The clinical aspects of the case accorded well with the microscopical observations, and were briefly as follows :—

On the morning of May 23, the day following the salvarsan injection, the rash had faded off the thighs, the part least affected, the skin lesions and sore were remarkably vascular. On May 27, this vascularity had disappeared and the signs of the disease had nearly all vanished except for the pigmentation of the rash. The temperature between the 22nd and 27th had oscillated between 99° and 101° in the morning and evening respectively; between the 25th and 27th the temperature descended rapidly to normal. Whether this temperature, after the salvarsan injection, was due to constitutional disturbance, the effect of absorption of the drug, or the result of the granule discharge and possible liberation of toxins it is impossible to say, but the possibility of the last supposition must not be overlooked.[1] On June 5, all swelling, the result of the injection, had subsided, and the left inguinal glands were normal. The patient was discharged from hospital to attend for observation.

Case No. 2.—A soldier, aged 23, was first seen on June 3, 1911. Infection had taken place fourteen days previously. He presented an indurated sore on the prepuce with enlarged and indurated glands in the left groin.

On examining with the dark background illumination blood-stained serum obtained from scraping the chancre surface, the syphilis and other spirochætes were found to be present in large numbers, and some were observed shedding granules.

On June 4, the patient was given salvarsan. Four hours after the injection, serum from the chancre, when subjected to examination, was found to contain spirochætes, but a great many of these had been killed outright by the drug. A few were observed granule shedding; their action was, however, very feeble, and they did not appear to have strength enough to complete the expulsion of all their granules. A relatively larger number of granules were, however, present than on the previous day.

June 5.—Granules present, but no spirochætes or periplasts. The vascularity of the lesion was well marked.

These cases confirm the observations already mentioned as having been made on the effect of salvarsan on the *T. pallidum*, but they also show that granule shedding occurs independently of the action of the drug, and the phenomenon is not confined to the spirochæte of syphilis, but is one exhibited by the other spirochætes commonly associated with it in primary syphilitic sores. Salvarsan, however, greatly increases this granule discharge, which we still think is evidence of a protective action on the part of these spirochætes, undertaken by them with a view to prevent their total extinction, the granules being of the nature of resistant spores, the further history of which remains unknown, but which, so far as those derived from *T. pallidum* are concerned, doubtless play an important part in relapses, and in the later manifestations of syphilitic infections.

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[1] This pyrexia was not due to syphilis alone. Prior to the injection the temperature was only slightly raised above normal.

A CONTRIBUTION TO THE STUDY OF THE ÆTIOLOGY OF BERI-BERI.

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PREFACE.

A RECENT outbreak of beri-beri in the 83rd Wallajabad Light Infantry has lent such valuable and interesting support to the view that this disease is directly connected with a diet of stale, raw, milled rice, that it appears well worthy of record.

Certain points favouring an intoxication theory of the ætiology of beri-beri, with a supposititious causal organism flourishing in the foodstuff, as against the more recent hypothesis of a deficiency of some constituent of the grain, removed in the rice polishings, are noted.

Under a separate title, the relationship of beri-beri to epidemic dropsy is considered, as the outbreak in the 83rd Regiment provided cases which seem to link up these two diseases, and attribute them both to the same fundamental pathological factor.

For the sake of simplicity, the subject of this paper has been divided under eight heads.

(1) Recent views upon the ætiology of beri-beri.

(2) The outbreak of beri-beri in the 83rd Regiment.

(3) The history of beri-beri epidemics in the 83rd Regiment.

(4) Native practice in the treatment of beri-beri.

(5) The two leading theories as to the ætiology of beri-beri.

(6) The probable existence of beri-beri amongst non-rice-eating communities, with a possible explanation thereof.

(7) Clinical histories of the cases of beri-beri in the 83rd Regiment.

(8) Summarized diagnosis of the epidemic.

It is as well to start with a clear idea as to the difference between "raw" and "parboiled," "fresh" and "stale" rice.

Rice known as "raw" is the ordinary "white" rice of commerce. After being gathered as paddy from the fields, it is directly husked, without any preliminary boiling by a heavy milling process, which removes with the husk the whole of the red envelope of the grain. Raw rice may be imported from abroad (i.e., Rangoon, Siam, &c.), and is then known as "foreign" rice, or it may be of local production, i.e., "country" rice. In the latter case, it is probably sold soon after being gathered, and hence is likely to be "fresh" rice.

In the former case, it is probably milled and stored on a large scale, and supplied as the demand requires, and hence is very probably "stale" rice.

Parboiled rice is rice which, having been garnered, is half-boiled before being husked. This process may be repeated two or three times. Subsequent to this parboiling, the husk is removed, usually by hand-pounding or more rarely in mills. The resulting grain is yellowish and waxy looking.

I.—RECENT VIEWS UPON THE ÆTIOLOGY OF BERI-BERI.

Before discussing the ætiology of the present outbreak of beri-beri in the 83rd Regiment, it will perhaps be as well to review briefly the recent opinions deduced from experiments on the causation of this disease.

Firstly, Leonard Braddon (*Proc. Bom. Med. Congress*, 1909) teaches that the cause of beri-beri is an intoxication resulting from the ingestion of a decorticated, raw, stale rice—this deduction he bases on three main facts.

(*a*) In the Malay Peninsula, one quarter of a million cases of beri-beri have been under observation, and these have occurred amongst rice-eating people only. None have arisen amongst non-rice-eaters.

Of the quarter million cases, 97·5 per cent were amongst the Chinese, who eat a raw, milled, stale rice. Another 1·5 per cent are furnished by other natives eating this same variety of rice. Tamils feeding on boiled rice, and Malays, feeding on fresh raw rice, absolutely escape.

(*b*) Dr. W. Fletcher's feeding experiments on patients in the lunatic asylum at Kuala Lumpur, in Selangor, lasting two and a half years. One half of the patients fed on raw, milled rice developed beri-beri, whilst the other half fed on boiled rice totally escaped.

(*c*) Fraser's, Stanton's and Braddon's experiments at Durian Tipus (*Lancet*, February and May, 1909), on coolies employed at road making. Only those coolies developed beri-beri who ate raw rice, those who ate boiled rice escaped. For further details of the carefully conducted and apparently conclusive experiments, reference may be made to the original articles.

Secondly, Schaumann (*Indian Medical Gazette*, November, 1909), experimenting with pigeons, rabbits, &c., concludes that nucleo-proteins are absolutely necessary for the organism, and that their absence gives rise to degeneration of nerve fibres, polyneuritis, &c.

In several cases of beri-beri developing on sailing-ships it was found that the foodstuffs were mouldy. Moulds have a great avidity for phosphorus and to obtain this they break up nucleo-proteins.

He insists on the greater phosphorus content of parboiled (0·754 per cent) as compared with raw (e.g., Burma) rice (0·323 per cent), which has the entire pericarp removed during the process of husking—i.e., is heavily milled.

Thirdly, Fraser and Stanton (*Proc. Lond. Soc. Trop. Med.*, February, 1910), report that they fed three groups of domestic fowls for five weeks on three varieties of rice. The first group fed on unmilled rice remained healthy, the second group fed on milled rice developed polyneuritis, the third group fed on milled rice plus the polishings removed from the rice during the milling process remained healthy. Fowls fed on parboiled rice likewise remained healthy. These experiments apparently show that it was the milling process which was at fault. An analysis of the percentage of phosphorus content varied inversely as their known beri-beri-producing tendency. Thus parboiled rice contained more phosphorus (0·469 per cent) than milled raw rice (0·277 per cent). Moreover the rice polishings removed in the milling process contained a relatively enormous amount of phosphorus (4·2 per cent). Fraser and Stanton therefore conclude that beri-beri is caused by deficiency of phosphorus in the diet. This phosphorus, in the case of rice, being removed with the pericarp of the seed in the polishings during the process of milling. It will be noticed that the phosphorus estimations of the two varieties of rice roughly agree with those obtained by Schaumann, parboiled rice containing about twice as much phosphorus as milled raw rice.

Fourthly.—At a meeting of the Far Eastern Association of Tropical Medicine, at Manila (*Brit. Med. Journ.*, April 23, 1910, and *Lancet*, April 30, 1910), attended by the official delegates from the Governments of India, Hong-Kong, Philippine Islands, Tsingtau (Imperial German Government) and Japan, the following resolution was passed: "That in the opinion of this Association sufficient evidence has now been produced in support of the view that beri-beri is associated with the continuous consumption of white (polished) rice as a staple article of diet, and the Association accordingly desires to bring this matter to the notice of the various Governments concerned."

Fifthly.—The French School (*Annales d'Hygiène et de Médecine*

Coloniales, No. 1, of 1910, and *Le Caducée*, February 19, 1910)[1] holds that in a "red rice[2], freshly husked, and a more perfect preservation of milled rice, the deterioration of which is difficult to prevent in these latitudes . . . . " lies the prevention and cure of beri-beri. Dr. Thézé, writing of the 1906 (? 1909) epidemic at Poulo-Condore, says that it was a year of average beri-beri intensity. Of a total of 130 deaths at the penitentiary, 119 must be assigned to beri-beri. "From the commencement of the disease," he writes, "convinced according to the general opinion that beri-beri was contagious and due to a parasite, either a microbe or intestinal worm, we brought our attention to bear on the thorough disinfection of the convict prison; the walls, beds and floors were whitewashed weekly . . . . But new cases and deaths occurred and white rice was still the chief food of the convicts. Thus checked in our efforts, red (half-husked) rice was substituted for white (cleaned) rice on August 13. The epidemic reached its height on August 15, and then ended very abruptly on August 22, with 119 deaths. No new cases were reported from August 20, and the last death took place on the 22nd." He upholds the theory of deficient phosphoric food value, but seems to pay a little attention to the fact that the red rice used

BERI-BERI CASES IN THE CENTRAL HOUSE AT SAIGON.

Year	Number of rations distributed to Asiatic convicts during the year	Average of daily rations	Number of deaths due to beri-beri	Remarks
1899	224,715	615	80	From November 5, 1903, the red rice necessary for the Asiatic convicts was husked at the prison. The deaths occurring in the last four years were among the Chinese and natives from the interior, already attacked before being imprisoned.
1900	229,356	628	78	
1901	185,350	507	92	
1902	169,661	464	85	
1903	213,231	584	78	
1904	272,313	746	3	
1905	284,512	779	6	
1906	313,991	860	15	
1907	278,204	762	5	

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[1] I am indebted to Major Clements, R.A.M.C., for these references, and also to Miss Rennick who translated Dr. Thézé's essay and the Reports of the Directors-General of Health of Indo-China and Cochin-China, for me.

[2] The rice contractor at St. Thomas' Mount tells me that "red" rice commercially means invariably parboiled rice. Raw rice with its red envelope is, he says, never called "red" rice, but I do not know in which sense the writer uses the term.

was "freshly" husked, whilst the white rice was old and stale. The substitution of this freshly husked red for an old white rice, he says, "played a curative part far superior to all the antiseptic or anthelmintic treatments (thymol included) hitherto employed. The editorial adds, "It is the modification in the food of the invalids which explains the perfect cure of all these patients returned to their families, and for whom nothing was changed except the character of their rations."

The remarkable table is given on the preceding page.

The French School undoubtedly attaches more importance to the heavy milling factor and the entire removal of the pericarp as the cause of beri-beri than to the factor of the staleness or freshness of the rice consumed. Indeed, Surgeon-Major Bréaudat, of the Pasteur Institute, of Saigon, has been permitted by the French Government to try the preventative and curative effect of the administration of rice polishings to the native prisoners and troops. The polishings must be the fresh produce, described in the husking mills under the name of rice flour, first quality. It must be sifted with care and should not contain any particles of husk which would irritate the digestive tube.

The following is the manner of prescribing it:—

Sifted rice bran	100 grm.
Simple syrup	60 ,,
Essence of peppermint	1 c.c.

Make into a paste and divide into ten boluses. Dose, 2 to be taken with each meal, 6 (600 grm. bran) daily. The published results of four months up to October, 1909, certainly seem encouraging and further details will be awaited with interest.

Sixthly.—For the results of Fraser and Stanton's most recent work (*Lancet*, December, 1910) announcing their renunciation of the phosphorus theory (see note at end of heading V.).

To sum up, during the last eighteen months, practically every investigator of the ætiology of beri-beri has been adding the results of his work to our common knowledge, and we may now conclude that a constant diet of raw, heavily-milled rice, especially if the superadded factor of staleness be present, is likely to give rise to an outbreak of beri-beri amongst its consumers—whilst a diet of fresh country or parboiled rice will not do so.

II.—The Outbreak of Beri-beri in the 83rd Regiment.

The present epidemic broke out in the 83rd Regiment during the months of July to November, 1910. The first patient, who only complained of slight leg pains and of inability to march, I thought was a malingerer. I failed to diagnose the next few cases, which showed œdema of the legs, altered knee-jerks and various forms of paræsthesia. When one of them, however, whilst under observation, suddenly developed peripheral neuritis, the diagnosis at once became clear, and the cause of the œdema noted in the early cases was immediately manifest.

The following are the chief ætiological points in connexion with the outbreak.

(1) Of the twelve cases, nine were recruits obtaining their rice direct from the Mohammedan recruit mess, one was a private, feeding at the same mess, whilst the remaining two were buying rice from the Bengali Bazaar, which was of the same variety as that supplied to the Mohammedan recruit mess.

(2) All the patients were Mohammedans; and all, as noted above, were eating the same variety of rice.

(3) The rice on which all these beri-beri patients were feeding had the following characters:—

(*a*) It was raw rice. (Not parboiled rice.)

(*b*) It was stale rice. (Not rice fresh from the fields.)

(*c*) It was milled rice. (Husks not removed by hand pounding.)

(*d*) It was Bezwada rice.

Now this is exactly the very type of rice, described by Leonard Braddon and by his co-workers, as being the ætiological factor in the production of beri-beri.

It may here be noted that the rice was neither mouldy nor weevily—and was repeatedly passed by myself as good rice fit for food.

(4) None of the Hindus or native Christians of our Regiment, who were using a parboiled rice (even though this was milled and from Bezwada), developed beri-beri, nor did any of our non-rice-eating Mohammedans fall victims to this disease (with one single exception, *vide* below, (5)). All our beri-beri cases had this one factor in common, namely, they were consuming a raw, stale and milled Bezwada rice.

(5) One patient, Pte. Abdul Naim, had eaten atta all his life, save on certain festival occasions when he would take some rice. On returning from furlough on June 5, 1910, he found himself moneyless. In order to obtain food, he indented on the Mohammedan recruit mess, which advanced him rations and deducted the cost thereof later from his pay. For the first time in his life, then, he fed on a staple rice diet, which, moreover, happened to be stale,

raw and milled. He continued to do this for four and a half months, when he developed beri-beri.

(6) On the ninth case appearing amongst the Mohammedan recruits, and not before, one change was made, and one change only. This change was to replace the raw, stale, milled, Bezwada rice supplied to their mess by a fresh (though still raw) hand-pounded, local rice, with the addition of a phosphorus pill twice weekly to their diet. No disinfection or earth-turning operations were instituted. There has not been a case of beri-beri amongst the recruits since.

(7) The nine recruit cases were all, naturally, in the same barracks, but the cases were not sleeping side by side; there is no evidence to support a contact theory as a cause of this epidemic. No precautions whatever have been taken in connexion with the disinfection of barracks or beds, nor have patients in hospital been isolated, yet no contact cases have been recorded.

(8) There are no grounds on which to support a theory of poisoning by arsenic, oxalates or fish—indeed, none of the patients as far as could be discovered had partaken of the two former at all, nor of the latter for many months. Ashmed's carbon dioxide poisoning theory will not hold, for the military open-air life of the recruits and their roomy, well-ventilated barracks preclude the possibility of over-crowding. Deficiency of nitrogen, fat or vegetables, cannot explain the outbreak, which affected Mohammedans alone and not the Hindus or native Christians, as the only difference in their diets was the difference between raw and parboiled rice.

(9) As to the many suggested and described protozoal, helminthological and bacterial causes for beri-beri, no recognized abnormal animal or vegetable organism was discovered in film examinations of the blood, urine or fæces of any of our patients. The total red and white corpuscle as also the differential blood-counts were normal, whilst blood cultivations from the patients' median basilic vein all remained sterile.

As a result, then, of a careful study of the ætiology of this epidemic, I believe that the direct cause of its outbreak was a diet of raw, stale, milled rice, and this in spite of the fact that it was consumed with a variety of foodstuffs.* (The daily recruit diet consists of rice 24 oz., mutton 4 oz., dall 2 oz.)

III.—HISTORY OF BERI-BERI EPIDEMICS IN THE 83RD REGIMENT.

The history of beri-beri in the 83rd Regiment is intensely interesting. The regimental records show that since 1899 there have been four recognized small outbreaks of this disease. One occurred at Secunderabad in 1899-1900, one at Rangoon in 1902, one at Cannanore in 1908, and the present one at St. Thomas' Mount in 1910. There were probably many other cases of beri-beri, occurring both during the epidemic, and also in the intervening years, which were diagnosed and returned as multiple neuritis or œdema of the legs, or which only attended the hospital and were shown as detained.

Thus during the years 1905-1909 the following number of cases were signed up in the annual regimental return of sick and wounded as suffering from these groups of symptoms.

Year	Cases of multiple neuritis or neuritis	Cases of œdema
1905	7	0
1906	1	1
1907	2	0
1908	3	2
1909	2	1

And again, in regard to the 1908 Cannanore outbreak, Lieutenant-Colonel J. A. Burton, I.M.S., says casually in a report that several slight cases of œdema were only detained, or attended the hospital without being shown in the records.

It would seem probable, therefore, that during the past few years many cases of beri-beri, in addition to the described epidemics, have existed in the regiment without being returned as such, and indeed the 83rd have probably suffered from the disease more or less constantly since 1900.

Now the point to be noted in the ætiology of these small epidemics in this regiment is, that during the first three outbreaks Hindus, native Christians and Mohammedans alike were all attacked by the disease, but during the present 1910 outbreak Mohammedans, and Mohammedans only, have suffered. Not a single case has occurred among the Hindus or amongst native Christians, who in former epidemics were both equally affected.

Why was this?

The tale told me by the native officers in charge of the various messes at the different stations is very interesting. These officers, moreover, knew nothing of the value of the information they were imparting, nor were any leading questions put to them. They said that at Secunderabad, in 1900, boiled rice was hard to obtain. All the Mohammedans and the majority of the native Christians and Hindus therefore, were eating raw rice. In 1901, the regiment left for Rangoon, where raw rice only was supplied throughout the messes. In 1904 they went to Bellary; but, having formed the habit of eating raw rice in Rangoon, they continued it, and also at Cannanore, where they arrived in March, 1908. At this station the raw rice they used came by steamers. During these periods then, Mohammedans, Hindus and native Christians alike were feeding on raw rice, and cases of beri-beri appeared indiscriminately amongst all these groups. But during the Cannanore epidemic of August and September, 1908, Lieutenant-Colonel J. A. Burton, I.M.S., reported that the raw rice consumed by the sepoys was not only stale and mouldy, but also full of weevils, and had an offensive odour, and advised that it should be changed. Parboiled rice was, therefore, issued to the Hindus and native Christians, whilst the Mohammedans who refused parboiled rice were supplied with a fresher and better variety of raw rice. Since that change not one case of beri-beri, of peripheral neuritis, or of œdema of the legs has occurred amongst the Hindus or native Christians, but the present epidemic has broken out amongst the Mohammedans who alone were feeding on raw rice.

As mentioned elsewhere, the raw rice which caused this epidemic was a stale, raw, milled, Bezwada rice. Immediately it was changed in November for a local, fresh, raw rice from Madura, Tanjore, &c., beri-beri ceased among the Mohammedans and not one case has arisen since.

The history of beri-beri in the 83rd Regiment then, seems to support in a remarkable way the theory that on a diet of parboiled rice beri-beri will not occur, whilst on a diet of raw rice, and especially if this rice be stale and milled, beri-beri may at any moment break out.

IV.—NATIVE PRACTICE IN THE TREATMENT OF BERI-BERI.

When the village hakim or native elder is called upon to treat that form of œdema which we know as wet beri-beri, he seeks out, they say, two leaves, the one a large five-lobed leaf which grows over walls and trees, and the other a small leaf growing wild on almost any maidan. From these two leaves he prepares a decoction, and administers it to the patient as a diuretic. In addition he makes one alteration in the diet. The patient is told not to eat rice, but to prepare chapaties from wheaten flour.

The treatment of the native elder, which has probably been founded on experience, supports the theory that rice is a causative agent in the production of beri-beri.

V.—THE TWO LEADING THEORIES AS TO THE ÆTIOLOGY OF BERI-BERI.

A study of the experiments made recently on the ætiology of this disease, the experience of the present outbreak in the 83rd Wallajabad Light Infantry, the history of past epidemics in the regiment, and, to a less extent, the support lent to the theory by the practice of the native elders, seem to leave no doubt whatever that at least one cause for an outbreak of beri-beri is a diet consisting of raw, milled, stale rice.

As to which of these three factors is the most important it is somewhat difficult to decide. That the rice should be *raw* is probably a *sine qua non.* If boiled rice be the staple diet then no epidemic of beri-beri will break out, or if it was ever found to do so then the other two factors would probably be discovered to exist in an accentuated form.

The influence of *heavily milling* the rice seems from Fraser's experiments to be of decided importance. By this process of polishing the red pericarp is in great part removed from the grain and the resulting highly polished white rice, when forming a staple diet, may at any moment apparently give rise to an outbreak of beri-beri.

We may here note that a possible reason why a boiled rice diet will not produce such an outbreak, whilst a raw rice one will (although both rices have been subject to an equally heavy milling), is because parboiling considerably toughens the pericarp and thus renders it far less liable to be removed completely in the milling process.

The effect of this process on the rice, if we accept Fraser's and Stanton's and Schaumann's experiments, is the loss of phosphorus.[1] Thus on this theory beri-beri becomes a disease of metabolism due in fact to a continued starvation of the individual as far as the phosphoric element in his diet is concerned. Now phosphorus, we know, is an essential food of the nervous tissues and, in its comparative absence from a given diet, one would naturally expect a degeneration of the nerve elements to follow, which is indeed the fundamental pathological change in every case of beri-beri (Yamagima, Wright, Durck).

As to the quality of *staleness* of the rice—it is apparently a fact that rice, although raw, provided it is freshly garnered from the fields, and lightly hand pounded, will not produce an outbreak of beri-beri. But if the rice is raw and stale (and not stored with such care as is taken at the Presidency Jail, Calcutta), then such an outbreak is probable. The quality of staleness then has probably some important influence in the determination of the onset of an epidemic of beri-beri.

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[1] See note at the end of this heading.

Moulds too, as Schaumann points out, thrive on phosphorus and to this end greedily break up nucleo-proteins, which in rice abound in the pericarp. Thus we can readily understand how any mouldy rice of whatever type may give rise to beri-beri—just as any heavily milled rice would—by a removal from it through the agency of the moulds of the natural phosphorus-containing nucleo-protein element.[1]

Indeed these recent researches seem to be really tending to explain and support the old protein starvation theory, but with the further addition of scientific reason and accurate detail.

If this theory of phosphorus starvation proves to be the true one, we may possibly find that those puzzling epidemics amongst non-rice-eating communities, which have been reported from time to time, may be due to the fact that the given diet in each individual outbreak was deficient in nucleo-protein (phosphorus) food value.

But so far we are only touching the very threshold of the ætiology of beri-beri. The point of absorbing interest is this—*is beri-beri a disease of metabolism only, or is it due to an infection?*

So far in this paper it has been written of as a disease of metabolism. What can be said in support of a theory of infection?

Firstly, that if beri-beri is an infection then the germ does not probably live in the patient's body. For contact cases do not seem to occur, inoculation experiments are unsuccessful, blood cultivations by many observers are futile and the cellular blood elements remained undisturbed. The infection then if it exists, is probably not a direct germ infection.

Secondly, the periodicity of the disease, and its occurrence in epidemic form, and the frequency with which it selects healthy young adults as its victims, do not favour a theory of disordered metabolism.

Thirdly, of our twelve cases of beri-beri, three whilst under observation developed a definite high fever lasting for an average of five days in each case.

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[1] See note at the end of this heading.

Now there were absolutely no symptoms of the onset of any independent pathological process to explain this pyrexia. In each case it commenced and terminated abruptly. Daily blood examinations and cellular counts failed to elicit any sign of malaria or the presence of other abnormal processes. There was no similar fever amongst any other patients in the hospital wards, nor indeed in the station. No physical signs were present anywhere in the patients' body to explain its occurrence.

But in each case, coincidentally with the rise in temperature, there was a most decided increase in the patient's beri-beri symptoms. Two of the cases on the second day of the fever suddenly developed a most marked peripheral neuritis with wrist and ankle drop and paralysis of the gluteal and spinal muscles, so that they were unable to raise themselves in bed. The third case was more fortunate. His symptoms of leg œdema and all altered sensations became increased, without the onset of any sign of severe neuritis.

Now, although one is taught that in beri-beri there is no definite high fever, yet three of our cases developed it in a most decided manner. I do not believe that this temperature could be explained by any discoverable fresh morbid process. I am forced to believe that the pyrexia was the manifestation of some acute condition in the patients' bodies, which was a few hours later also responsible for a most severe accentuation in the patients' beri-beri symptoms.

If this be so, no simple theory of abnormal metabolism alone is sufficient to explain the ætiology of beri-beri. This theory must be replaced by one of poisoning by the products of germ life, or the two may be combined.

To harmonize the facts supporting these two theories is indeed a difficult task, which however must be attempted. That beri-beri is an intoxication is held by two such authorities as Sir Patrick Manson and Leonard Braddon. The former is inclined to believe that the germ grows in the patient's environment, in the rooms, the soil or the ship. He advances strong arguments for an intoxication theory, and then asks: Why should patients begin to mend so rapidly after they leave the locality? To me there is little evidence to support a place infection theory, compared with that surrounding an infection of food-stuffs, and the answer to Sir Patrick Manson's question appears to be: Because on leaving the locality the patient obtains a fresh and non-infected diet.

Leonard Braddon believes that the germ lives on the outside of the grain, and produces a toxin, which when ingested with the rice gives rise to beri-beri. Parboiling rice directly after it has been gathered kills the germ, if present, and hence no toxin is produced, and no beri-beri outbreak will occur. With raw rice on the other hand the germ may continue to thrive. The staler the rice, the more the toxin produced, and the greater the risk of contracting beri-beri. This theory, however, does not explain the supposed heavy milling factor in the production of beri-beri, nor why rice polishings, together with a heavy milled rice diet, will not give rise to beri-beri-like symptoms in fowls. It must be remembered, however, that the evidence upon which the heavy milling of rice as an important factor in the production of beri-beri depends is in the main laboratory evidence. And, moreover, this laboratory evidence rests on the production of multiple neuritis in fowls—a disease which has in the past led two former observers astray, and may of course be one quite different from beri-beri.[1] And one is almost tempted to forsake for the time being such testimony in the face of other overwhelming observed facts collected by men from actual clinical experience with beri-beri patients.

That the probable growth of some germ in the rice is the causative factor in the production of beri-beri seems further to be supported by the freedom which the Presidency Jail, Calcutta, enjoys from an outbreak of this disease. Since 1905, stale, raw, milled Burma rice has been supplied to the prisoners, but this rice is stored with great care, one seer of slaked lime being added per maund of rice to preserve it. This powdered slaked lime is washed away before the rice is issued as food. One at least can say this, that although the rice is just the type we would expect to give rise to an epidemic of beri-beri, yet by the addition of a substance, during storage, which inhibits germ life, the prisoners remain free from beri-beri. On the other hand, if this disease is due to the removal of some essential food constituent during the heavy milling process, which the particular rice in question has been subjected to, how can the addition of slaked lime during storage give the prisoners the immunity to beri-beri they possess?

To sum up, beri-beri may be a disease of metabolism or a toxæmia. The view that beri-beri is an intoxication with the causative germ multiplying in a food-stuff medium under atmospheric conditions of high temperature and moisture is the one which would certainly appear most probable. The food-stuff which the germ commonly infects is rice. Parboiling the rice kills the germ and stops the toxin production. Infected raw rice, if stale, will contain much toxin and will give rise to an epidemic. The influence of heavy milling in connexion with this theory had best be left untouched until further investigation has cleared the ground to a greater extent than is at present the case.

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[1] Maurer and Trentlein produced a condition resembling beri-beri in fowls, polyneuritis gallinarum, by giving them oxalic acid in their food, and on these experiments based their oxalic acid theory.

But, however difficult all this lore on the subject of beri-beri may be, we have one clear practical fact before us—parboiled rice will not give rise to beri-beri, while a rice stored without precautions, milled and stale, will bring about an outbreak of this disease.

NOTE.

Since this paper was written, Fraser and Stanton have published a further valuable research on the ætiology of beri-beri (*Lancet*, 1910, vol. ii. p. 1,755). Although still holding that this disease is brought about by a white rice which has had the pericarp too thoroughly removed from it by a heavy milling process, and that the polishings contain the essential for the prevention of beri-beri, yet they have satisfied themselves that this essential *is not phosphorus*, but some as yet unnamed precipitation principle which they have separated.

This important result would appear to shake the foundation of the metabolism theory to a greater extent than ever, and hence indirectly lends additional weight to the intoxication hypothesis.

VI.—THE PROBABLE EXISTENCE OF BERI-BERI AMONGST NON-RICE-EATING COMMUNITIES, WITH A POSSIBLE EXPLANATION THEREOF.

No paper on the ætiology of beri-beri would be complete without a brief reference to its apparent existence amongst practically non-rice-eating communities.

The reference must of necessity be brief, for but little is known of this part of the subject, and my own practical experience of it is unfortunately nil.

Now there are two questions to which an answer must be attempted:—

Firstly: Does it exist?

Secondly: If so, is any possible explanation forthcoming?

To the first question then, until it is disproved, a guarded reply in the affirmative may be given; for there are on record many outbreaks of beri-beri, reported by competent medical officers, amongst British regiments and European crews of ships and amongst isolated individuals, where stale rice has apparently been a negligible factor. There is, too, the history of the famous outbreak at the Richmond Asylum, Dublin.

Lieutenant-Colonel McGill, R A.M.C. (*Proc. Bom. Med. Congress*, 1909), reported sixty-one cases of shin œdema and tachycardia, associated with pain and weakness of the legs, which occurred in a British infantry regiment at Poona in 1907. The diagnosis lay between alcoholic neuritis and beri-beri. But although the men were alcoholics, yet the outbreak appeared in epidemic form. So that although the cases were possibly (and perhaps probably) cases of alcoholic peripheral neuritis with heart trouble, yet one cannot utterly ignore the possibility of a diagnosis of beri-beri being the true one.

Major Clements, R.A.M.C., tells me of an outbreak which he watched in a British battery at Mandalay in 1901, in which the symptoms described still more closely resembled those of beri-beri. All were alcoholics, and yet other British troops within a few miles, equally alcoholic, were unaffected. The outbreak, too, was of an epidemic character, some twenty cases occurring amongst some eighty men within a few weeks in the hot damp season.

The Annual Reports of the Sanitary Commissioner with the Government of India, too, since 1900, have yearly shown some outbreaks returned as beri-beri amongst the British troops of the Indian Army, but no satisfactory explanation of any epidemic has yet been forthcoming.

In the face of these and similar reports then, it would be foolhardy, without practical experience, to deny the existence of beri-beri, where its presence could not be explained by the stale, raw rice theory.

Secondly, granted for the present that beri-beri may exist amongst non-rice-eaters, is there any possibility of connecting up these puzzling outbreaks and those undoubted epidemics amongst rice-eaters which are certainly due to the ingestion of a stale, raw rice, and probably to a toxin the result of the growth of an organism therein?

I believe that this possibility exists, and it is somewhat supported by an outbreak of beri-beri which Captain Gharpurey, I.M.S., tells me he observed whilst in Aden, in 1908. He was then in charge of the 113th Infantry, and amongst them some six cases presenting signs of leg œdema, altered knee-jerks, tachycardia, partial anæsthesia and marked tenderness of the calf muscles occurred. At the same time in this hot, damp climate, twenty-eight cases presenting similar signs were reported from the British troops. Now of the several native cases, some two took a small amount of rice daily, whilst the remainder were atta feeders alone. Now the quantity of rice consumed by the latter and by the British garrison was negligible. None of these natives took alcohol, and the medical officer at Aden reported that the incidence of the disease was not greater in the case of the British troops among beer drinkers than among others (Report of the Sanitary Commissioner with the Government of India, 1908). But Captain Gharpurey noticed this most important point. The atta supplied to the native troops was mouldy, stale and weevily. The same atta was baked into wheaten loaves and supplied to the British troops. This atta flour had been imported from India, and stored in large quantities for some time in the Aden godowns, and hence was consumed at an uncertain date after being prepared from the fresh wheat grain. No satisfactory cause for the outbreak has been brought forward.

The similarity between this epidemic of beri-beri, possibly due to stale weevily wheat flour, and those outbreaks which we know are due to stale rice is apparent, and at once suggests the possibility of a far broader view of the ætiology of this disease.

Might beri-beri not be a toxæmia produced by a specific germ infection of various stale grains (e.g., rice, wheat), and, perchance, of even other still more varied food-stuffs? This suggestion at present, is, of course, merely a bye-thought, which however would seem worthy of attention by those who have to deal with outbreaks of a beri-beri-like disease amongst non-rice-consumers.

VII.—CLINICAL HISTORIES OF THE CASES OF BERI-BERI IN THE 83RD WALLAJABAD LIGHT INFANTRY.

The chief clinical facts brought out by the 83rd Wallajabad Light Infantry patients collectively were as follows:—

Of the twelve patients, eight evidenced only such comparatively slight signs of their disease as œdema, various forms of paræsthesia and altered knee-jerks. One was a picture of exaggerated muscular inco-ordination, with the gait and bearing of a case of pseudo-hypertrophic muscular paralysis. Three, after first being under observation for œdema, paræsthesia, and loss of knee-jerks, developed marked peripheral neuritis, two of these cases being of the severest possible kind.

The more important symptoms grouped under the heading of the separate systems were:—

(1) *Nervous System.*—(*a*) *Hyperæsthesia* definitely existed in two cases.

(*b*) *Paræsthesia,* such as sensations of weakness and heaviness of limbs, numbness, tingling and dragging pains, was present in every case.

(*c*) *Feather Anæsthesia.*—In ten this was slight and affected practically the lower extremities only. One had complete feather anæsthesia of the whole body excluding the dorsal aspect of the head and back. One had no anæsthesia at all.

(*d*) *Peripheral Neuritis.*—Three cases showed definite severe peripheral neuritis—two of these developed it suddenly (with pyrexia) in the middle of the night, whilst in the case of the third the peripheral neuritis took four months after his first symptoms to develop, until he became absolutely unable to walk or to stand at all. Two other cases had definite tenderness on pressure of the calf muscles.

(*e*) *Pain* was not a prominent symptom, save in the two cases of acute peripheral neuritis, in both of which the limbs were exquisitely tender.

(*f*) *Reflexes.*—Knee-jerks in eight cases were absent throughout. In one case the jerk was always present. In one case it was noted as being increased at first, diminished later, but always to be obtained. In two cases it was always most markedly and definitely increased, one of these being watched for a period of six weeks.

The superficial reflexes were invariably present.

(*g*) *Atrophy of Muscles.*—Almost all the patients showed some atrophy of their calf muscles, which was proportionate to the other symptoms.

(2) *Circulatory System.*—(*a*) Palpitation of the heart; (*b*) oppression in the chest; (*c*) shortness of breath; (*d*) pains in the heart region, were all common.

The pulse was frequently rapid—especially after marching a few yards—some soft cardiac bruit, especially over the pulmonary valve, was the rule. No definite evidence of right-sided heart dilatation was ever noted. One patient bled from the nose. No alteration in the general blood condition of our patients occurred. The blood counts were normal and averaged:

Total white cell count	5,938
Total red cell count	5,230,000
Percentage of red cells	105 per cent.
,, hæmoglobin	97 ,,
Colour index	0·9
Ratio of white cells to red	1 to 880

The average differential count of all the patients was also normal and worked out as follows: –

Polymorphonuclear leucocytes	68 per cent.
Large mononuclear lymphocytes	10 ,,
Small ,, ,,	15 ,,
Transitional cells	2 ,,
Eosinophile ,,	1 ,,
Mast cells	4 ,,
	100 per cent.

(3) *Respiratory System.*—Attacks of oppression in the chest and of shortness of breath, as noted above, were complained of.

(4) *Digestive System.*—Constipation was the rule, two patients had diarrhœa, one vomited, and one passed slightly bloody mucous stools for two days.

(5) *Urinary System.*—The urine was measured in four cases and found to be slightly diminished, about 40 oz. daily. Every case was repeatedly tested for albumen and sugar, but these were never found to be present.

(6) *Skin and Serous Membranes.*—(*a*) Rashes were not noted in any patient.

(*b*) *Œdema* occurred in ten cases: this was limited to the lower limbs, but in two of these the patients complained of feeling "like a stick, as though their whole body were swollen." No sign of this could be discovered. In the remaining two cases, whilst under observation, the œdema was noticed to spread up over the entire body, thighs, loins, abdomen and face.

(*c*) *Circumscribed Œdemas* were not seen.

(*d*) *Effusions into Serous Cavities* were not noted, although repeatedly tested for.

(7) (*a*) *The General Condition of the Patients* was good, and, but for the cases of paralysis and those complaining of respiratory or cardiac distress, they gave no cause for anxiety. One patient suffered from malaria as a complication.

(*b*) *Pyrexia.*—Three of the series developed a definite high fever for three or four days, which could not be explained in any other way than that it was due to beri-beri toxin.

This conclusion, moreover, is supported by the fact that two cases out of the three developed a multiple neuritis on the second day of the fever, whilst the third showed a decided increase in the severity of his symptoms.

Five others had slight early pyrexia varying from 99·5° to 102°, usually for one day only, without showing malarial parasites in their films, or any signs suggestive of malaria.

(*c*) *Previous Attacks.*—One patient said he had had leg œdema a year ago.

(*d*) *Mortality.*—No death occurred.

(8) *The Treatment* adopted in every case was absolute rest, boiled rice diet, varied with mutton, eggs and extras, together with a mixture of atropine, digitalis and strychnine, and a daily phosphorus pill.[1] The paralysed patients were massaged, and galvanism was applied to the atrophied muscles.

My best thanks are due to Lieutenant-Colonel J. T. Calvert, I.M.S., and Major Leonard Rogers, I.M.S., of the Medical College Hospital, to Major Hunter, I.M.S., of the Presidency Jail, and to Captains Megaw and Foster, of the General Hospital, for many kindnesses and much valued and instructive conversation during my visit to Calcutta in connexion with this outbreak; to Major Clements, R.A.M.C., Sanitary Officer, 9th Division, and to Major Donovan, I.M.S., of Madras, and to my colleague, Captain J. E. Hoar, R.A.M.C., at St. Thomas' Mount, and lastly to Dr. F. M. Gibson, Director of the King's Institute, Guindy, without whose kind help and invaluable assistance many of the bacteriological and cellular investigations undertaken would have been impossible.

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[1] No therapeutic importance is now attached to the administration of this pill; it would not be given to any future case.

CHRONIC BACILLARY DYSENTERY DUE TO A HITHERTO UNDESCRIBED BACILLUS.

By Major W. S. HARRISON.
Royal Army Medical Corps.

Although bacillary dysentery has been attributed at various times to many other members of the coli group besides the Shiga, Kruse, and Flexner bacilli, I have thought it would be useful to put on record the following case which seems to have been caused by a bacillus which, so far as I have been able to trace, has not been previously described.

The patient, a man aged 35, was taken ill whilst in Morocco in September, 1909, with a disease characterized by fever, diarrhœa, and the passage of blood and mucus; he was extremely ill at the time, and from his statement the symptoms were those of a pretty severe attack of dysentery. This first illness lasted for about two weeks, after which he recovered sufficiently to resume his work; but between that time and the end of 1909 he had two acute relapses, each lasting three or four days, during which he passed blood and mucus. From January, 1910, until the time he consulted me at the end of April in the same year he suffered continually from dyspepsia, irregularity of the bowels, with frequent diarrhœa and the passage of quantities of mucus, occasionally bloody, and his general health became seriously impaired. When I first saw him the patient was pale, sallow, and emaciated, he was easily exhausted, and his general aspect was that which is so common in cases of chronic tropical diarrhœa; his appetite was poor and capricious, and he was passing three or four watery offensive stools daily; there was a good deal of abdominal pain of a griping character, but he did not suffer from tenesmus. The tongue was coated with a thick yellow fur, and there was an area of marked tenderness over the splenic flexure of the colon, but no thickening of the gut could be felt. A white cell count of the blood showed 9,800 leucocytes per cubic millimetre, with no alterations from the normal in the percentage of the different white cells present. His serum failed to agglutinate laboratory strains of Flexner's and Shiga's bacilli or Paratyphoid B, but it agglutinated the bacillus which was isolated from his stools, and which will be described later, in a dilution of 1 in 60 in an hour. The stools were watery, extremely offensive, and contained numerous fragments of undigested food and a considerable quantity of mucus; there were a number of polymorphonuclear leucocytes present, but no blood cells or amœbæ were found either at the first or subsequent examinations. Culture of the mucus on neutral red bile salt lactose agar gave an almost pure growth of an apparently non-lactose fermenting organism the details of which will be given below. *Bacillus coli* was conspicuous by its absence. Treatment consisted in putting the patient on a milk diet with 4 oz. of mutton or chicken daily, and a small quantity of bread; in addition, he was given 10 oz. of a milk culture of Massol's bacillus daily. The colon was irrigated daily with two litres of saline solution, followed as soon as this was evacuated by two litres of a 1 in 1,000 solution of quinine hydrochloride in saline which the patient was instructed to retain as long as possible. The irrigating solutions were run into the bowel through a long tube from a height of 18 in., the temperature of the fluid being 103° F. in the can. In addition, considering that the bacillus which was present in such numbers in his stools seemed to be the cause of the trouble, he was given weekly doses of 100 millions of a vaccine made from it.

Under this treatment he very rapidly improved, the diarrhœa was replaced by constipation requiring castor oil, mucus very soon ceased to be found in the stools, and the irrigation was discontinued at the end of two weeks. The organism referred to, however, continued to be present in the fæces to the exclusion of all *B. coli*, until May 14, when cultures failed to give any growth at all (this result may have been due to the fact that the sample was collected after the quinine irrigation). On May 21 the cultures showed large numbers of *B. coli*, with only six colonies of the non-lactose fermenting organism on two 12-in. plates. On May 28 the stools appeared to be perfectly normal, there was no mucus, the fæces were almost free from smell, and gave a copious growth of *B. coli*, with only three non-lactose fermenting organisms on two plates. The patient's general health had improved very much, and his subsequent convalescence was uneventful; at the last observation of the fæces no non-lactose fermenting colonies were to be found.

Characters of the Organisms in the Fæces.—Of a very large number of colonies which were tested, some twenty or thirty, all but one corresponded to the characters described below; the one exception was a colony which proved to be composed of Flexner's bacillus; it was found at the first examination and never subsequently. The other organism produced colonies resembling those of *B. typhosus* on neutral red lactose bile salt agar; it was a non-motile rod, about as long as a typhoid bacillus, but somewhat thicker, growing isolated, but occasionally seen in chains of two or three elements. It did not stain by Gram's method, and did not liquefy gelatine. Culture in broth gave a diffuse growth, litmus milk became acid in twenty-four hours, and the acidity was permanent. In the first experiments with the freshly isolated culture there was no clotting of the milk, but in later tests with the culture, after it had been subcultured on agar for about a month, the milk became clotted on the tenth day, indol was formed in peptone and salt solution within five days. The bacillus produced acid and gas in glucose and maltose media within twenty-four hours, and in dulcite media in three days. Sucrose, mannite, raffinose, inulin, and salicin were unchanged after fifteen days; there was no fluorescence produced in neutral red glucose bile salt agar. The reactions with lactose were somewhat peculiar, the original colonies had all the appearance of those of a non-lactose fermenting organism, and with the earlier cultures lactose was unchanged after fifteen days. But on again testing the same strains, after several subcultures on agar, it was found that the bacillus had acquired the power of fermenting lactose; in these later tests there was no change until the end of the seventh day, after which acidity slowly developed and was marked by the tenth day; no gas production occurred in the lactose cultures. The results of simultaneous tests, made on the same batch of media to compare the organism with Morgan's bacillus No. 1 (A), and the bacillus of Hog cholera (Macfadyean), are given in the accompanying table :—

	Patient's bacillus				Morgan 1 A				Hog cholera			
Days	1	3	7	14	1	3	7	14	1	3	7	14
Litmus milk..	A	A +	Bleached	Clot	A ±	Alk.	Alk. +	Alk. + +	A ±	A	A	A ±
Glucose ..	A G	A G	A G	A G	A G	A G	A G	A G	A G	A G	A G	A G
Lactose ..	–	–	A ±	A	–	–	–	–	–	–	–	–
Sucrose ..	–	–	–	–	–	–	–	–	–	–	–	–
Mannite ..	–	–	–	–	–	–	–	–	–	–	–	–
Maltose ..	A G	A G	A G	A G	A G	A G	A G	A G	–	–	–	–
Dulcite ..	–	A G	A G	A G	–	–	–	–	–	–	–	A ±
Raffinose ..	–	–	–	–	–	–	–	–	–	–	–	–
Inulin ..	–	–	–	–	–	–	–	–	–	–	–	–
Salicin ..	–	–	–	–	–	–	–	–	–	–	–	–
Neutral red ..	–	–	–	–	–	–	–	–	–	–	–	–
Indol	..	..	+	+	..	..	+	+	..	..	–	–

It will be seen that the bacillus differs from Morgan 1 A in producing permanent acidity and eventual clot in milk, that it ferments lactose with the formation of acid after seven days, also that it produces acid and gas in dulcite media. It differs from the bacillus of Hog cholera (Macfadyean) in producing the late clotting of milk, in forming acid and gas with dulcite, also in the fact that, like Morgan 1 A, it forms indol.

The bacillus was tested for its pathogenic properties on rabbits and guinea-pigs. In doses of ½ c.c. of a twenty-four hour broth culture given hypodermically to rabbits, it killed the animal within eighteen hours with symptoms of diarrhœa. Post-mortem: there was a large gelatinous exudate at the point of inoculation, with general and severe congestion of the vessels of the abdominal wall and numerous subcutaneous hæmorrhages; there was a quantity of blood-stained serum in the peritoneal cavity, and the whole length of the small intestine was acutely inflamed. The large intestines and cæcum were much distended with gas, but were not inflamed. The spleen was not enlarged. Cultures from the heart blood gave a copious growth of the organism. On the other hand, the same culture administered to rabbits by the mouth in repeated doses of 2 to 5 c.c. produced no symptoms whatever, and similarly, a dose of 10 c.c. of a filtrate of a ten-day old broth culture gave no result when administered hypodermically to rabbits. The virulence of the organism was lost after a month's sub-culture on agar. In guinea-pigs a hypodermic inoculation of 5 c.c. produced a large induration at the point of injection, which subsequently gave way to a large slough; there was no diarrhœa, and the general health of the guinea-pigs was not impaired. The culture of Flexner's bacillus, which was isolated on one occasion, produced no effect on either rabbits or guinea-pigs, whether injected hypodermically in a dose of 5 c.c. of the broth culture, or administered by the mouth.

My reasons for thinking that the organism which has been described was probably the cause of the patient's illness are: It was a pathogenic bacterium having a special affinity for the bowel, and was present in enormous numbers in the stools and especially in the mucus; it was agglutinated by the patient's serum in a dilution of 1 in 60, and not by normal sera in dilutions above 1 in 5; its decline in numbers and eventual disappearance from the fæces coincided with the improvement in the patient's general and bowel condition. It is justifiable also, I think, to believe that the rapid improvement after administration of a vaccine made from the bacillus was some evidence that it was this germ which was causing the trouble; it might be retorted to this, however, that the other treatment which the patient received was the cause of his improvement. I can only answer that the patient was practically free from bowel symptoms a fortnight after the commencement of treatment, an unusually rapid progress in cases of chronic bacillary dysentery treated on general lines without vaccine.

My reasons for excluding the idea that the case was one of infection with Flexner's bacillus were: the patient's serum did not agglutinate this germ, and the single colony of Flexner's bacillus which was found was not pathogenic. An interesting point in the reactions of the bacillus is that after sub-culture it developed some power of fermenting lactose and clotting milk, and that its activity in fermenting maltose and dulcite was much increased after living on artificial media for a month.

EXPERIMENTAL KALA-AZAR IN THE GREY MONKEY OF THE SUDAN (*CERCOPITHECUS SABÆUS*).

By Lieutenant W. E. MARSHALL.
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(*From the Floating Laboratory of the Wellcome Tropical Research Laboratories, Khartoum.*)

Successful experimental inoculation of animals with kala-azar has become a well-recognized fact in the case of the parasite of infantile kala-azar (*Leishmania infantum*). Nicolle and his colleagues, pioneers in this work, have frequently infected monkeys and dogs. So far they have only succeeded in infecting these animals by intraperitoneal inoculation, and subcutaneous injection has only given a local reaction without general infection. They also found that passage of the disease from monkey to monkey attenuated the virus, but the same phenomenon did not occur in dogs. They recognize differences in the infection in these two animals. In the monkey there is marked enlargement of the spleen, and the disease resembles the human type of the disease. In the dog the spleen is only slightly enlarged and the infection is insidious. One of the dogs inoculated with the disease, and which died seventeen months after inoculation, showed no symptoms for fifteen months. They also found that in a series of dogs there was great variation in the susceptibility of the individual animal. With regard to immunity they have found that in an animal incompletely cured, or only just recently recovered, a second inoculation produces a severe and fatal result, whereas in an animal cured for some time immunity is conferred. Immunity is also produced by the virus of Oriental sore. Excision of the spleen in the dog has produced no effect on the course of the disease.

Nicolle and his colleagues have also found that Leishmaniosis occurs as a natural infection in the dog, and this has recently been confirmed by Gabbi and Basile in Italy, Critien in Malta, Alvarez in Lisbon, and the Sergents in Algiers. Basile recognizes two different forms of natural infection in the dog, the acute and chronic, and he thinks that the former, which affects principally young dogs and lasts from three to five months, plays a more important part in the spread of the disease. He was able to infect three young dogs by keeping them beside cases of infantile kala-azar, and he thinks the flea (*Pulex serraticeps* and perhaps

P. irritans) is the likely transmitting agent. Jemma, Gabbi, and Alvarez and Pereira da Silva have all succeeded in infecting dogs intraperitoneally with *L. infantum*, and Jemma has also produced infection by intravenous inoculation.

Laveran and Pettit, besides infecting dogs, have tried infecting rats and mice, but could not produce a general infection.

Novy, by the use of large and repeated doses of cultures of *L. infantum* on Novy and MacNeal's medium, has been able to produce infection in the dog.

Patton, working with Indian kala-azar, failed to infect dogs even with repeated inoculation, but probably he killed his animals too soon to say definitely that infection does not occur.

PRESENT INVESTIGATION.

The following experiments were carried out with parasites obtained from cases of kala-azar in Sennar Province in the Anglo-Egyptian Sudan. In this province the disease affects chiefly children about 12 years of age, though adults are also occasionally infected. So far we have found the best method of infecting monkeys is from a splenic puncture during life. An ordinary sterilized hypodermic syringe is taken, washed out with sterile citrate solution, and spleen puncture carried out in the ordinary way, the contents of the syringe being immediately injected into the peritoneal cavity of a monkey.

Twelve monkeys were used in these experiments, and the results are shown in the following table. Eight monkeys were infected with kala-azar, in three the experiment failed, and in one the result still remains doubtful.

INFECTED CASES.

Of the eight infected cases, five were infected intraperitoneally, one subcutaneously, one subcutaneously and intravenously, and one was naturally infected.

Of those infected intraperitoneally, monkey B was chloroformed on the 62nd day, when the spleen was found to be enlarged, and Leishman bodies were present in moderate numbers; no parasite could be found in the liver, so probably the spleen becomes infected before the liver.

Monkey D died on the 65th day from a mixed infection of tuberculosis and Leishmaniosis, and it is interesting to record the degenerate nature of the parasites in this case. The parasites were most degenerated in the spleen, which was heavily infected with tubercle, and were best preserved in the bone-marrow, where the tubercles were scanty. The post-mortem examination was done immediately after death, so the change in the parasites could not be a post-mortem one.

Monkey E was infected by the 54th day, became very ill with diarrhœa on the 143rd day, and was chloroformed on the 145th day. It was heavily infected with parasites.

Monkey N, inoculated intraperitoneally from monkey E, remained quite well, but, owing to Leishman bodies being present in monkey S (*vide infra*), liver puncture was carried out, and doubtful Leishman bodies were seen 35 days later, the 155th day; the monkey died, and the post-mortem examination showed the spleen to be enlarged, and parasites were found in the spleen, liver, and bone-marrow There was a small ulcer in the ileum.

Monkey P, which died on the 134th day, was heavily infected with parasites.

Of those infected subcutaneously, in the case of monkey R the injection was made into the subcutaneous tissues of the thigh with a post-mortem splenic emulsion from a case of kala-azar. On the 150th day the spleen was found to be enlarged, and liver puncture showed the presence of Leishman bodies. On the 156th day the peripheral blood was examined, and in the fifth slide three parasites were found inside a large mononuclear cell. This monkey is still alive.

Monkey L received an intravenous and subcutaneous injection; it was intended to inject intravenously, but only the first portion of the virus entered the vein, the remainder entering the subcutaneous tissues of the forearm. Examined on the 161st day the spleen was found to be enlarged, and spleen puncture showed the presence of Leishman parasites. This monkey is also still alive.

The remaining monkey, which was a very young animal, was put in the same cage as monkey N on the day that the latter was inoculated intraperitoneally from monkey E. It remained in that cage, and on the 112th day it became ill. On the 117th day liver puncture showed the presence of Leishman bodies, and on the 121st day it died, thirty-four days before monkey N. It was very heavily infected, parasites being present in large numbers in the spleen, liver, and bone-marrow.

With regard to the negative cases, monkey H was inoculated with a splenic emulsion from a case of kala-azar, the emulsion being made eight hours after the death of the patient, when no

Animal	Where inoculated and date of inoculation	Material inoculated	Course of disease	Result	Organs infected	Remarks
Monkey B..	Liver and peritoneum 9.1.10	Post mortem spleen puncture. Case 4	30th day liver puncture negative 53rd day liver puncture negative 62nd day chloroformed	Infected	Spleen + Liver –	Spleen slightly enlarged; parasites present in moderate numbers.
Monkey C..	Peritoneum 12.3.10	Post mortem spleen emulsion. Monkey B	8th day peripheral blood negative 22nd day peripheral blood negative 33rd day peripheral blood negative 45th day peripheral blood negative. Liver puncture negative 66th day liver puncture negative 94th and 95th days liver puncture negative 108th day chloroformed	Not infected	Spleen – Liver – Bone-marrow –	—
Monkey D..	Peritoneum 21.4.10	Spleen puncture. Case 3	14th day peripheral blood negative 55th day liver puncture negative 63rd day Ill.: Dyspnœa, splenomegaly. Liver puncture negative. Spleen puncture negative 65th day died	Infected	Spleen + Liver + Bone-marrow +	Miliary tuberculosis also present; spleen markedly infected with tubercle.
Monkey E..	Peritoneum 23.4.10	Spleen puncture. Case 1	14th day peripheral blood negative 54th day liver puncture positive 58th day peripheral blood negative 78th day Spleen enlarged. Spleen puncture positive. Liver puncture negative. Peripheral blood negative 143rd day diarrhœa. Liver puncture positive 145th day chloroformed	Infected	Spleen + Liver + Bone-marrow +	Monkey emaciated; spleen enlarged; liver enlarged and cirrhotic; bone-marrow red; intestinal intussusception present.
Monkey H..	Peritoneum 21.6.10	Post mortem spleen emulsion. Case 1	65th day chloroformed	Not infected	Spleen – Liver – Bone-marrow –	The spleen emulsion in Case 1 was made 8 hour after death.

Monkey K..	Sub-cutaneous tissues 11.7.10	Spleen puncture. Monkey E	160th day spleen enlarged. Liver puncture negative	161st day spleen puncture negative	163rd day spleen puncture negative	—	—	Still alive.
Monkey L..	Intra-venous and sub-cutaneous 11.7.10	Spleen puncture. Monkey E		161st day spleen enlarged. Spleen puncture positive		Infected	—	Still alive.
Monkey N..	Peri-toneum 11.7.10	Spleen puncture. Monkey E	120th day liver puncture doubtful	155th day died		Infected	Spleen + Liver + Bone-marrow +	Small ulcer in small intestine, ileum; smears and sections of this negative.
Monkey O..	Peri-toneum 26.7.10	Post mortem spleen puncture. Case 10		42nd day found dead		Not infected	Spleen – Liver – Bone-marrow –	Spleen not enlarged.
Monkey P..	Peri-toneum 31.7.10	Post mortem spleen emulsion. Case 11	123rd day liver puncture positive	134th day died		Infected	Spleen + Liver + Bone-marrow +	—
Monkey R..	Sub-cutaneous tissues 31.7.10	Post mortem spleen emulsion. Case 11	150th day spleen enlarged Liver puncture positive	156th day peripheral blood positive		Infected	—	Still alive.
Monkey S..	Not inoculated	Kept in cage beside Monkey N	112th day ill	117th day liver puncture positive	121st day died	Infected	Spleen + Liver + Bone-marrow +	Lived continuously with Monkey N; became naturally infected, and died before Monkey N.

parasites were visible in the spleen smears (monkey E was successfully infected from the same case during life).

Monkey C was inoculated with a spleen emulsion from monkey B, but was not infected by the 108th day, when it was chloroformed. Probably, as Nicolle has pointed out, the parasite tends to lose its virulence when inoculated from monkey to monkey, and this might account for the non-infection in this case, though the positive results obtained in monkeys L and N show that infection can be conveyed from monkey to monkey. In the case of monkeys L and N, however, the inoculation was made from a splenic puncture during life, and in the case of monkey C a post-mortem splenic emulsion was used.

Monkey O died 42 days after inoculation. There was no apparent cause of death, and no Leishman bodies were found.

Monkey K, which was inoculated subcutaneously, and which is still alive, shows definite enlargement of the spleen, but one liver puncture and two spleen punctures have so far given negative results.

The Presence of Parasites in the Peripheral Blood of Infected Monkeys.—Parasites are present in the peripheral blood of infected monkeys, but are difficult to find. In two infected monkeys, stil alive, we have searched carefully for parasites in the peripheral blood. In one monkey we found in the fifth slide three parasites inside a large mononuclear cell; in another monkey, out of seven slides examined, we found one parasite inside a polynuclear cell.

Captain Archibald, R.A.M.C., has also successfully infected the red monkey of the Sudan (*Cercopithecus ruber*) with the disease.

We have tried inoculating dogs, but so far have failed to infect that animal as, with one exception, all the animals died soon after inoculation. We have also not yet met with spontaneous Leishmaniosis in the dog.

In the Sudan form of kala-azar the parasite is present in the peripheral blood in over 80 per cent of the infected people. The parasite morphologically resembles that of Indian kala-azar and infantile kala-azar; growth into flagellate forms has been obtained in 10 per cent. citrate, on Novy and MacNeal's medium, and on Nicolle's modification of that medium. Full details of these investigations will appear in the reports of the Wellcome Tropical Research Laboratories at Khartoum.

CONCLUSIONS.

(1) The ordinary grey monkey of the Sudan, *Cercopithecus sabæus*, can be infected with kala-azar.

(2) It can be infected by intraperitoneal or by subcutaneous inoculation of the parasite.

(3) It can also be infected naturally, an uninoculated monkey, living in close contact with an infected monkey, having contracted the disease.

(4) The parasites are present in the peripheral blood of infected monkeys.

(5) So far we have found that the best method of infecting the monkey is by injecting into the peritoneal cavity the contents of a spleen puncture taken during life.

I beg to acknowledge my indebtedness to Captain D. S. B. Thomson, R.A.M.C., who was associated with me in investigating kala-azar in Sennar Province, for help and advice, and to Captain R. G. Archibald, R.A.M.C., for carrying on the experiments while we were both absent on leave.

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SOME OBSERVATIONS ON BODY TEMPERATURE.

By Captain P. DAVIDSON, D.S.O. and Captain N. DUNBAR WALKER.
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These observations were made by the officers specializing in physical training during their course at the Royal Army Medical College. All the temperature records, except those before rising, were taken in the rectum, with half-minute clinical thermometers retained for a full minute. All temperatures are Centigrade readings, and for convenience the corresponding Fahrenheit values are also given.

Many observers have drawn attention to the fact that a rise of body temperature occurs during muscular work and all are agreed that it is physiological, but that the rise of temperature may be of assistance to the body is not wholly understood. That the respiratory centre is rendered more sensitive by, and that the extensibility of muscle increases with a rise of body temperature are two points quoted in the textbooks. Lately Barcroft and King (*Journal of Physiology*, vol. xxxix) have shown that the dissociation of oxyhæmoglobin is facilitated by a rise of temperature, as "it appears that the oxygen dissociates from the hæmoglobin about twice as rapidly at 41°C. as at 36°C." ; they argue that this helps the mechanism for meeting the increase of metabolism in muscle which occurs during muscular work, because "each corpuscle spends a much shorter time in the capillary than when the muscle is at rest, and therefore it must divest itself of oxygen at a greater rate than is normally necessary." In "Further Advances in Physiology," Pembrey states: "It appears that a rise in temperature within certain narrow limits is beneficial. The chemical changes associated with muscular work are probably facilitated by a temperature a degree or two above the temperature during complete rest."

The point at which this rise may become pathological is of importance. In the "Second report on the physiological effects of food, training and clothing on the soldier" the committee state that "no abnormal results were observed when the rectal temperature of some men reached 38·8° C. (102° F.), but above that point inefficiency and a rapid irregular pulse were observed." The range of temperature in a normal man is less than 2° C. (3·5° F.) (Pembrey, "Animal heat, 'Schäfer's Physiology' "), and only once in our records was this exceeded. It is probable that in the relationship of surface and deep temperature will be found an indication of impending pathological conditions, and it is in this direction that more work is required.

The results of eight marches carried out by five subjects are here charted and all particulars will be found in the tabulated diary.

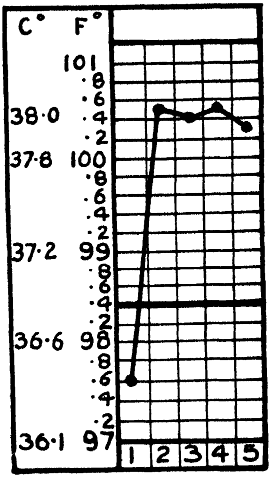

CHART 1.—The average rise for the five subjects for eight marches.

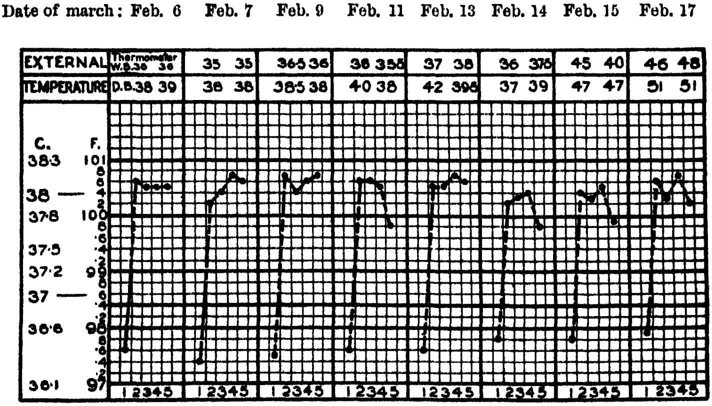

CHART 2.—The average rise of the five subjects during each of the eight marches.

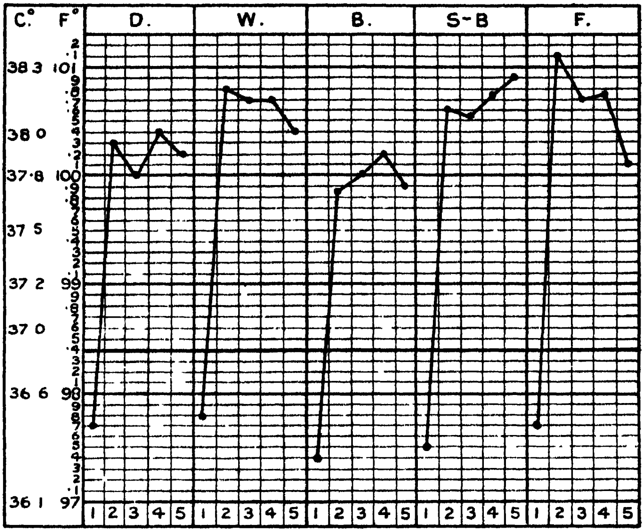

CHART 3.—The average individual hourly temperature during the eight marches.

(1) Temperature on rising.
(2) ,, at end of 1st hour's marching (10 minutes' halt).
(3) ,, ,, 2nd ,, (lunch halt, 30 minutes).
(4) ,, ,, 3rd ,, (10 minutes' halt).
(5) ,, on return home.

Mean weight of each subject (stripped) .. .. 68·2 kilos. (10 st. 10 lb).
,, ,, ,, (loaded) .. .. 78·4 ,, (12 st. 5 lb.).
The average distance marched.. .. .. .. 24·4 kilometres (15¼ miles).
,, rate of march .. .. 98 metres per minute.
,, daily temperature .. .. .. {41·3° F. dry bulb. 38·4° F. wet bulb.
,, ,, relative humidity .. .. .. 77 per cent.

Individual age, height and weight (stripped) :—

D. ..	36½ years.	Height, 5 ft. 8½ in.	Weight, 65·5 kilos.
W. ..	35 ,,	,, 5 ,, 9½ ,,	,, 72·7 ,,
B. ..	32 ,,	,, 5 ,, 10½ ,,	,, 67·2 ,,
F. ..	32 ,,	,, 5 ,, 10¾ ,,	,, 64·9 ,,
S.-B...	32 ,,	,, 5 ,, 11 ,,	,, 71·2 ,,

Tabulated Diary of all the Marches.

Date	Time of start; hrs. and min. a.m.	Condition of roads	Weather	Thermometer				Total time in hours and minutes		Distance travelled		Rate of march, metres per min.	Work done. Calories per kilo. body weight		
				Start		Finish		Start to finish	Marching	Horizontal (km.)	Vertical (metres)		Horizontal	Vertical	Total
				W. B.	D. B.	W. B.	D. B.								
1911 Feb. 6 ..	10.33	Greasy and heavy	Dull and misty; breeze E.N.E.	36	38	36	39	4.41	3.51	22·5 (14 m,)	273·9 (913 ft.)	97·5	13·5	2·1	15·6
„ 7 ..	11.30	Dry and good going	Dull and misty; breeze S.W.	35	38	35	38	4.15	3.35	21·7 (13½ m.)	273·9 (913 ft.)	101·0	13·2	2·1	15·3
„ 9 ..	10.26	Dry, good going, except 3 miles very hilly	Dull and cloudy; no breeze	36	38	36	38	5.45	4·40	27·3 (17 m.)	478·3 (1,594 ft.)	97·7	16·4	3·6	20·0
„ 11 ..	10.43	Heavy and slippery	Clear and sunny	38	40	35	38	5.14	4.2	21·0 (13 m.)	434·4 (1,447 ft.)	90·0	12·4	3·2	15·7
„ 13 ..	10.39	Good, slippery in places	Clear and sunny	37	42	38	39	5.55	4.40	28·5 (17½ m.)	419 5 (1,398 ft.)	101·7	17·4	3 1	20·5
„ 14 ..	10.30	Slippery at start, later dry	Misty, then sun; breeze S.W.	36	37	37	39	5.37	4.18	26·2 (16 m.)	263·0 (877 ft.)	101·7	16·1	2·0	18·0
„ 15 ..	10.45	Slippery and muddy	Bright and clear; slight N. breeze	45	47	40	47	5.10	4.17	23·8 (14½ m.)	208·9 (696 ft.)	90·0	14·2	1·5	15·7
„ 17..	10.42	Very muddy and greasy in places	Bright and sunny; breeze N.W.	46	51	48	51	5.0	3·54	24.1 (15 m.)	455·9 (1,519 ft.)	103·2	15·1	3·4	18·5

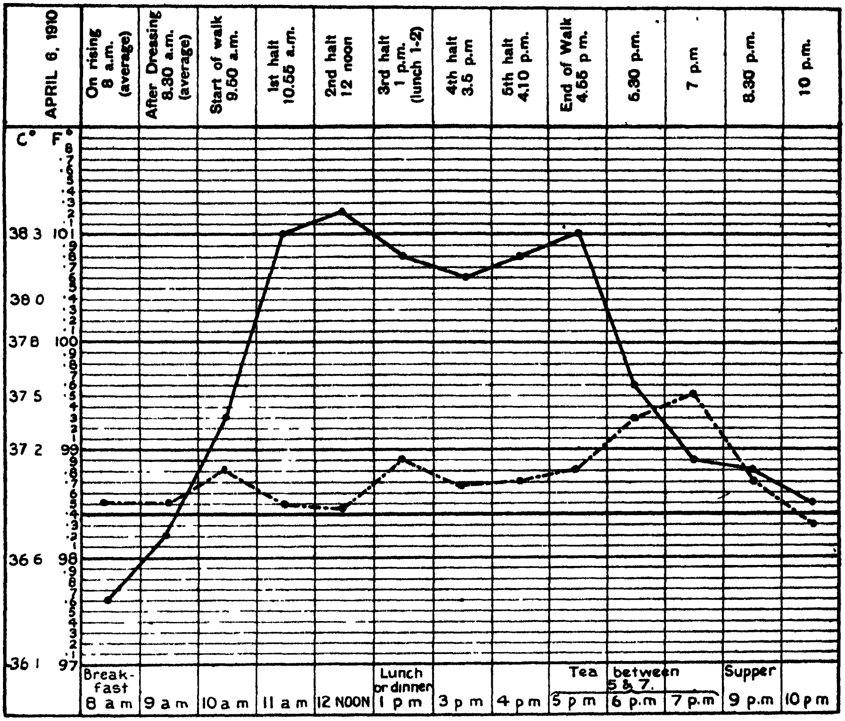

CHART 4.—Variation in body temperature throughout the whole day on which a long walk was taken. (Subject: N. D. W.)

Particulars of walk: Distance 32·18 kilometres (20 miles) at 97·5 metres per minute, no wind, cloudy and rain last 2 miles. Body weight 80 kilos, calories expended 1,704.

This chart is inserted to give some idea of the changes in body temperature before, during, and after a long walk. The unbroken-line curve, together with the hours above, represent height of and times of taking the temperature during the walk; the dotted-line curve and hours below are the average hourly variations per day of a medical student, representing some 343 observations. (Pembrey and Nicol, *Journal of Physiology*, vol. xxiii, 1898.)

Consideration of these records, in relation to the following :—

(1) *Work done.*—This has had no influence, as the amount performed did not vary greatly, although the rate of marching, an important factor in heat production, showed considerable variation. The average weight carried was 10 kilos. (22 lb.).

(2) *Clothing.*—All the subjects wore ordinary dress with rucksacs every day except on the 17th, when three (D., W., and F.),

wore "shorts," which appeared to make no difference, a result to be expected considering the season of the year.

(3) *External Temperature.*—This, which is generally acknowledged to be the most important factor of all in heat production during muscular work, has here had no influence, as the daily temperature varied so little. Later we shall discuss this point, comparing our figures with some obtained in India which have been placed at our disposal.

(4) *Food.*—"The effect is to slightly raise the temperature of the rectum." (Pembrey and Nicol, *Journal of Physiology*, vol. xxiii, 1898.)

In Chart 1, the rise after lunch is seen even when the temperature is already above 37·7° C. (100° F.). Chart 2 demonstrates this on all days except the 6th, when there is no change, and the 11th, which shows a slight drop. In Chart 3 of individual averages all show rises except subject W., who at lunch ate far less than the others.

(5) *Training.*—It is well established that this may considerably lessen the rise. Quoting again from the "Second report of the committee on physiological effects of food, training and clothing on the soldier," the experiments "show that after three weeks practice a trained soldier in full marching order can march the same distance over the same road with less fatigue than that produced when he performed the first march of the series in ordinary dress," as shown by a diminished rise of the rectal temperature. Also A. Mosso ("Life of Man in the High Alps," p. 132), summing up the results of some experiments with students climbing to a height of 400 metres, says "We see thus that training gradually lessens the increase of temperature after exertion." It is of course a well-known fact that with practice muscular work can be performed more economically and hence with less combustion, or as Mosso puts it, "Training is an unconscious instruction, which we give to the nervous system, which is thus taught to effect the contraction of the muscles without unnecessary expenditure of chemical work." All the subjects on this occasion had been living a somewhat sedentary life for the previous three months but had as a rule been accustomed to regular exercise. Here we find no reduction in the level attained in the later marches (see Chart 2); perhaps the number of marches was not enough to show this.

(6) *Fatigue* (see Chart 5).—On Febuary 9, the third march of the series, subject S. B., the only one of the party really fatigued, shows a high temperature at the finish which continued for some hours. This may have been due to delayed combustion of metabolites.

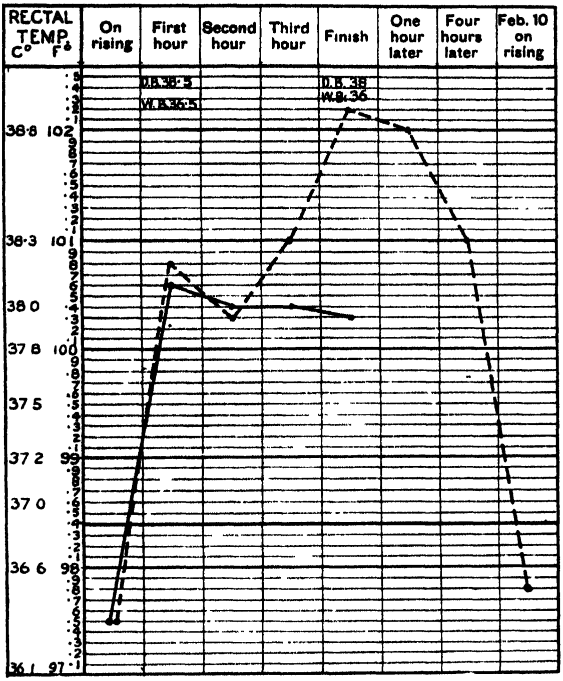

CHART 5.—February 9, 1911 : March of 27·4 km. (17 miles), rate of march 97·7 metres per minute.

Average of four subjects ; subject, S.—B. (dotted).

(7) *Individual Idiosyncrasies.*—As is well seen in Chart 3, some of the individuals attained their maximum temperature at the end of the first hour, while in others the temperature rose more slowly ; the level maintained throughout the march varied in different individuals.

General Conclusions.—It would appear, provided the heat regulating mechanism of the body is not interfered with by causes such as unsuitable clothing or a high wet-bulb temperature, that there is a " normal rectal temperature " for marching, in exactly the same way as there is a normal rectal temperature in bed after a night's rest. One might say that there is an optimum temperature for different amounts of body work, and in marching this appears to be somewhere between 37·8° C. (100° F.), and 38·3° C. (101° F.). Referring to Chart 1, we might go further and say that it was somewhere between 37·9° C. (100·2° F.) and 38.1° C. (100·6° F.). Similar observations to these made at the same time of the year in

1910 show that the average marching (33 observations) of three subjects was between 37·9° C. (100·3° F.) and 38·1° C. (100·5° F.).

One of us (N. D. W.) has made some further observations after bicycling and playing squash-racquets. They were obtained in the same way, using a one-minute Kew-certificated clinical thermometer retained for two full minutes. All these observations were made during the months of March and April, 1910. Walks taken during the same period are also tabulated and all records are for one hour's exercise.

Form of exercise	Clothing worn	Number of observations	Average temperature on starting	Average temperature after one hour	Difference	Remarks
			Degrees	Degrees	Degrees	
Walking ..	Ordinary dress	8	37·1 (98·8)	38·1 (100·5)	0·96 (1·7)	4 miles per hour
Bicycling ..	Ordinary dress	6	37·3 (99·1)	38·1 (100·6)	0·81 (1·5)	11 miles per hour
Squash-racquets	Flannels	8	37·7 (99·9)	38·5 (101·4)	0·81 (1·5)	Closed court

From the above table it will be seen that the highest temperatures occurred during squash-racquets, the maximum rise was 1·4° C. (2·4° F.). It should be noted that the starting temperature was high; this is because all the observations except one were made between 4 p.m. and 6 p.m., the time of the highest daily variation (Pembrey and Nicol, *Journal of Physiology,* vol. xxiii, 1898). It seems immaterial at what temperature one starts playing; on one occasion, starting at 10 a.m., it was found that the temperature rose in half an hour from 37·2° C. (99° F.) to 38·3° C. (101° F.). All the observations were made on separate days. The bicycling was over undulating country, and where more than one observation was made on the same day one hour's rest always intervened. In walking, each observation is that of a separate walk. The light clothing worn when playing squash-racquets and the rapid passage through the air when bicycling no doubt increased convection and evaporation, and hence the "difference"[1] is not so great as in walking, but we do not think the figures are comparable by estimating "difference." It would appear that what has been suggested about optimum temperature may also apply here and that for a more rapid and violent exercise such as squash-racquets a higher level is attained than in walking, to facilitate the more rapid chemical changes that are in progress.

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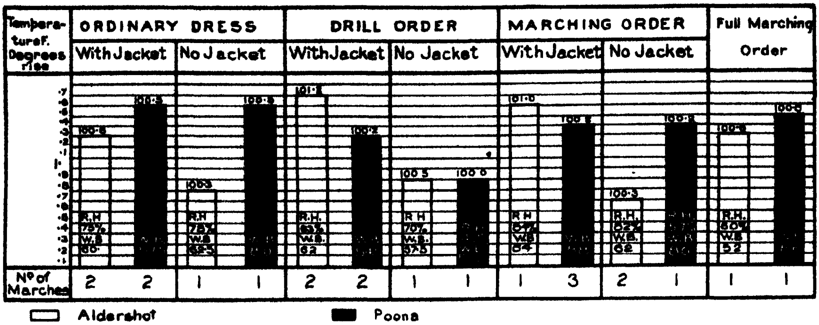
[1] "Difference" is the rise of temperature between the beginning and the end of the exercise.

To medical officers, this subject is of interest when considering the load carried and the clothing of the soldier when marching, and also the atmospheric conditions during marches. Zuntz and Schumburg (" Physiologie des Marches," p. 309), say: " Heat production is four or five times greater when marching than at rest," and again, p. 128, "It is interesting to note that a load of 31 kilos. (68 lb.) in favourable weather causes approximately the same rise of temperature (38°-39·7°) as a light one (22 kilos. or 48 lb.) in tropical heat." It should be noted these observers took the temperature in the urine stream. It is to prevent such physiological rises of temperature as we have recorded from becoming pathological that recommendations of medical officers should be directed and further research engaged in. The regimental officer now realizes the importance of the clothing, load, and march as discipline factors. The danger of the physiological temperature becoming pathological lies in " the fact that once the balance of the mechanism of heat regulation in the human body has been definitely upset by high external temperature, combined with almost total abolition of heat loss in evaporation, a vicious circle is established. The internal temperature rises, and as a result the oxidation processes and therefore the production of heat also increase, so that the body temperature rises still further, and so on." (Sutton, *Journal of Pathology and Bacteriology*, 1908, vol. xiii, p. 62). It is the difference between the dry and wet-bulb temperatures to which we wish to direct attention. Haldane (*Journal of Hygiene*, vol. v) in his broad conclusions says, "During muscular work in still air, the limit of wet-bulb temperature which could be borne without abnormal rise was much lower" (than when at rest). " At a wet-bulb temperature of about 87° F. (30·5° C.) the rectal temperature rose about 3.5° F. in an hour. In an air current of 135 linear feet per minute, a wet-bulb temperature of about 84° F. (29·5° C.) could be borne without abnormal rise of body temperature, but 87° F. (30·5° C.) was beyond the limit."

By permission of the Professor of Hygiene we have been allowed to examine Captain L. E. L. Parker's observations made in Poona, 1909. These have been compared with the results in the " Second Report on the Physiological Effects of Food, Training and Clothing on the Soldier," and are here charted and diagrammatically represented.

The diagram shows the rise of rectal temperature after marching two hours (about 7 miles) with a ten minutes halt at the end of the first hour. At Aldershot one of the marches (ordinary dress, with

jacket) was without a halt and another march (marching order, with jacket) was only of one hour's duration.



A comparison of the effect of different amounts of clothing and equipment on men marching at Poona and Aldershot. (Average of five men at Poona and four men at Aldershot.)

Captain Parker on both occasions superintended these marches and they differ only in the following points :—

Points of difference.	Aldershot	Poona
(1) Dress	Serge, with trousers	Drill with "shorts."
(2) Hour of starting	11 a.m.	8.30 a.m.
(3) Average starting body temperature	37·5° C. (99·45° F.)..	37·2° C. (98·95° F.)
(4) Average wet bulb temperature	60° F.	85° F.
(5) Relative humidity ..	73 per cent. (average)	58 per cent. Humidity (mean) at 8 hours for May, 1910, *Bombay Gazette* Supplement, Part II.

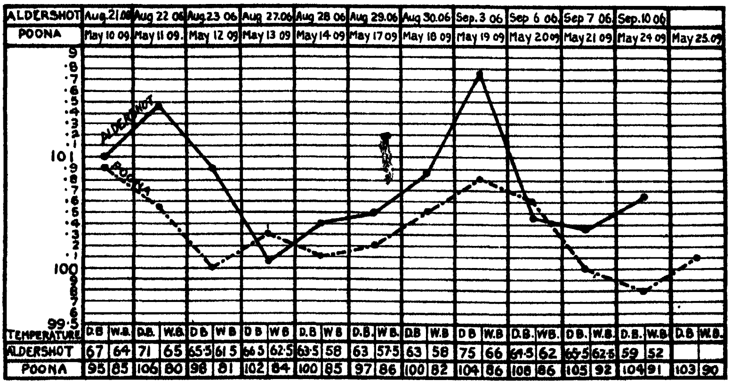


Chart 6.

The rectal temperature (average of four men at Aldershot and five at Poona) after marching two hours at Aldershot and Poona charted for comparison. The marches are recorded in sequence, irrespective of clothing worn and equipment carried. (See table below.)

There was a ten minutes' halt at the end of the first hour, except on August 21, when the march was only for one hour and on August 22 and 23, when there was no halt.

TABLE OF CLOTHING WORN AND EQUIPMENT CARRIED.

Date—1906	Aldershot	Date—1909	Poona
Aug 21..	Marching order.	May 10..	Ordinary dress with jacket; no equipment.
,, 22..	In shirt sleeves, overcoat carried on the back.	,, 11..	Ordinary dress, no jacket or equipment.
,, 23..	Ordinary dress.	,, 12..	Drill order, no rifle or jacket.
,, 27..	,, ,, no jacket.	,, 13..	,, ,, no rifle.
,, 28..	,, ,,	,, 14..	,, ,,
,, 29..	Drill order, no jacket.	,, 17..	Marching order, no jacket or greatcoat.
,, 30..	,, ,,	,, 18..	Marching order, no greatcoat.
Sept. 3..	,, ,,	,, 19..	Full marching order.
,, 6..	Marching order, no jacket or overcoat.	,, 20..	,, ,, ,, with 100 rounds ball ammunition.
,, 7..	Marching order, no jacket.	,, 21..	Marching order.
,, 10..	,, ,, and 100 rounds ball ammunition.	,, 24..	,, ,,
		,, 25..	Ordinary dress.

NOTE.—The five men at Poona had all been in India from two to five years.

It is significant that the point to which the body temperature rose in Poona, with an average wet-bulb temperature approaching Haldane's limit (on the three last marches passing it) should not be greater than that at home in Aldershot, though the "difference" appears greater in the diagram on account of the starting temperature in India being lower, the earlier hour of starting possibly accounting for this. But in Chart 6, where the average march temperatures are recorded in sequence without comparing load or clothing, the lower level of body temperature maintained at Poona is very evident. With the lowered metabolism of Europeans in tropical climates, it might *a priori* be expected that the body temperature would be maintained at a lower level than in temperate climates; on this point the evidence is conflicting. Rattray (mouth), Davy (mouth), and Crombie (mouth and axilla) say it is raised. Boileau (axilla) confirmed by Thornley and Furnell, Pinkerton (axilla), and Wick (mouth), all maintain there is no change. Johnston (axilla) records an actual reduction. We can find only one authority (Crombie) who has made any observations on rectal temperature in the tropics regarding this point, and he only states "that in healthy Europeans in India the rectal temperature is higher than that in the axilla." A series of rectal observations on new arrivals and those long resident in the tropics to clear up this matter would be most valuable. It should be noted that in the Poona experiments the difference between the wet and dry bulbs is very considerable, and that on no occasion did the atmospheric conditions approach saturation. At Aldershot the relative humidity was considerably higher than at Poona, and this with the difference in clothing at each station may partly explain the lower level maintained at Poona. It is of interest to note that with a thermometer below zero Linhard ["Danmark Expeditionem Til Grönlands Nordoskyst," 1906-8, vol. iv, No. 1 (see *British Medical Journal*, April 8, 1911)], says, "that on going for a walk with the thermometer 36° C. below zero the rectal temperature rose." These experiments in India tend to bear out our contention that there is an optimum marching temperature somewhere between 37·8° C. (100° F.) and 38·3° C. (101° F.) provided every facility is afforded to the natural means of heat regulation.

Our thanks are due to Captains G. A. K. Reed, W. W. Browne, R. H. Bridges, H. H. J. Fawcett, and C. R. Sylvester-Bradley for placing their results at our disposal and to Lieutenant-Colonel C. H. Melville for kind assistance with suggestions.

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Clinical and other Notes.

A CLINICAL NOTE ON TWO CASES OF KALA AZAR TREATED WITH SALVARSAN.

By Major A. E. WELD.
Royal Army Medical Corps.

Case 1. W. T., a boy aged 1 year and 7 months, was brought to the Military Families Hospital, Valetta, as his parents had noticed that for some time past he had been getting very weak and pale, losing flesh, and did not take his food well. They did not keep any dogs in their quarters.

On admission (April 16, 1911), he was intensely anæmic, his conjunctivæ were blanched and colourless, and his skin was "café au lait" coloured. Examination of the chest revealed nothing abnormal. Examination of the abdomen revealed enlargement of the spleen and the liver. The spleen occupied the left hypochondriac, the left half of the epigastric, and the upper portion of the left lumbar and umbilical regions, and extended for about three fingers breadth below the costal margin. His temperature on admission was 102·4 F.

A provisional diagnosis of kala azar was made.

He was ordered bone marrow in addition to his ordinary diet, and was given cod-liver-oil and malt, and infusion of senega. For the first eight days (April 16-23), his temperature ranged from normal to 102·4 at night, and his pulse varied from 140-160, and the respirations between 38-48. His general condition appeared to be gradually getting worse, he was very listless, did not play with his toys, could not sit up without help, and was soon tired; he slept most of his time. He took his food moderately well, but was often sick after it (probably owing to the excess of fat in the food). The condition of his spleen remained much the same. On April 14 his temperature fell to normal, and remained so until he was discharged from hospital. On April 23, it was decided to try the effect of salvarsan. His weight then was 19 lb. 3¼ oz., his differential white blood corpuscle count was · polynuclears, 28·2 per cent; small mononuclears, 59·0 per cent; large mononuclears, 18·8 per cent; Myelocytes 2·3 per cent. His spleen measured 2¼ in. below the costal margin in the left mammary line, and its edge felt thick and sodden.

Under chloroform and ether anæsthesia a liver puncture was made, and the smears were examined by Major Babington, who found the kala azar parasite. An unsuccessful attempt was made to administer the salvarsan intravenously, but the small lumen of the vein caused the needle to become blocked; eventually half a grain of salvarsan dissolved in 20 cc. of normal saline and caustic soda solution, was injected intramuscularly between the scapulæ.

On examining him 48 hours after, a very marked improvement was noticed. But the most extraordinary change was noticed in his spleen, which no longer occupied the epigastric and upper part of the umbilical regions, and could no longer be felt in the left mammary line, but had retired to the left hypochondriac and upper part of the left lumbar regions. Three days after the injection his white blood corpuscle count was 9,300. His general condition had improved out of all knowledge, he took an interest in his surroundings, and played with his toys. He began to put on weight and took his food well. On May 14, his weight was 22 lb. 5 oz., his lips and conjunctivæ were no longer colourless, but were a decided red. He could sit up by himself, and crawl about his cot. On May 27, his improvement appeared to be maintained. He was very lively, laughing and shouting in his play, and could walk about the ward. He slept well, and ate well. His lips and conjunctivæ were normal in colour, and there was a tinge of colour in his cheeks. The condition of the spleen remained as it was forty-eight hours after the injection. He was discharged hospital under observation on May 27, his weight was then 22 lb. 2 oz.

Case 2. K. E., a girl, aged 1 year and 5 months, was admitted to hospital on April 27. For about two months previously she had been treated in quarters for bronchitis, and as she was getting weaker and more anæmic and thinner, her parents brought her to the hospital, on March 17. She was then very anæmic, and was found to have an enlarged liver and spleen. The provisional diagnosis of kala azar was made, and as a hopeless prognosis was given, her parents declined to leave her in hospital, and she was treated in her quarters. During this time until her admission on April 27, she had an intermittent temperature, ranging from normal in the morning to 103-104 at night, the pulse ranged from 120 to 160, and the respirations from 40 to 80. Owing to the encouraging result after salvarsan in case 1, she was admitted for like treatment. On April 28, her white blood corpuscle count was 4200, her weight was 15 lb. 15¾ oz., temperature 102, and the lower edge of the spleen was below the level of the umbilicus. She had numerous marks resembling old fleabites. Half a grain of salvarsan was dissolved in 20 cc. of normal saline and caustic soda solution, and injected intramuscularly between the scapulæ under chloroform and ether anæsthesia, at the same time smears of the liver, and of bone-marrow from the head of the tibia were obtained. The smears were examined by Major Babington, who discovered crowds of kala azar parasites in all of them. Next day her temperature was normal, morning and evening, and her general condition slightly improved, but no change was noticed in the spleen. She gained in weight for five days after the injection, and then began to lose again. Her weight on the fifth day was 16 lb. 6¾ oz. On the seventh day after the injection the temperature began to go up again, and on the ninth day a second injection of salvarsan gr. 1 in 40 cc. of saline and caustic soda solution (half between the scapulæ, and half above the buttocks) was given; at the same time a second liver puncture was made, and more parasites than before were found. For five days after the second injection she gained weight from 15 lb. 14 oz. to 16 lb. 2¼ oz., and the temperature remained normal, but on the sixth day it began to rise, and from now on she became rapidly worse. On the seventeenth day her white blood corpuscle count was only 1900, on the eighteenth day she developed pleurisy and died on the twentieth day. All through she had a cough and signs of bronchial catarrh. She never took her food well.

Remarks. Whether the remarkable result of case 1 is a case of *Post hoc vel propter hoc*, I cannot say, but as many of my brother officers have far greater opportunities of treating this disease than we have in Malta, I present this note for their consideration. Of course it is too early to claim a cure for case 1, but his improvement was miraculously rapid. It is unfortunate that case 2 ended fatally, but hers was a much more acute infection, and there was a strong suspicion of tubercle about her. Even in her case there was a temporary improvement after each injection.

In case 1 there was no sign of any local reaction after the injection of salvarsan, and in case 2 there was no reaction after the first injection, and only a slight induration at the site of the injection over the buttocks, after the second.

A FATAL CASE OF PARATYPHOID FEVER A.

By Captain W. R. BLACKWELL.
Royal Army Medical Corps.

Private F., King's Own Regiment, was admitted to the Station Hospital, Lucknow, on February 19, 1911, suffering from fever. He said he had not been feeling well for about four days. His temperature varied from 100° F. to 102° F. for two days after admission. On the 21st (seventh day of the disease) a blood culture was taken; this remained sterile, and the Widal reaction was ∓ 1 in 40 to *B. typhosus*, and negative to *B. paratyphosus* A.

On the morning of the 25th his temperature was normal, but he complained of some abdominal pain, and said he felt sick. There was no rigidity or distention. When I saw him at 6 p.m. he was quite comfortable, temperature 102, pulse 104. The pain commenced again at 7.30 p.m., and at 10 p.m. I saw him in consultation with Captain Shea, R.A.M.C. He then had a typical acute abdomen. A provisional diagnosis of appendix abscess was made, and immediate operation decided on. Captain Shea opened the abdomen through a right pararectal incision. A normal appendix was found. As a quantity of seropurulent fluid escaped when the peritoneum was opened, a further search was made, and a perforation found in the ileum about six inches above the ileo-cæcal valve. The perforation was closed, the pelvis swabbed out with dry gauze and a drainage tube put in. The intestine was very much congested about the site of the perforation, and there was no attempt on the part of the peritoneum to form adhesions. For the next two days the patient's condition was very good, but his intestines were evidently in a very atonic and paralyzed state. In spite of enemas of various kinds, and sulphate of magnesium by mouth, his bowels would not move. He became distended on the evening of the 28th, and the abdomen was re-opened. The intestine was opened at the side of the old perforation, and irrigated with sulphate of magnesium solution. It was then sutured to the edges of the wound, drainage tubes being secured in the upper and lower portions of the bowel. No fæcal matter was discharged from either tube, and he gradually got worse and died on March 2.

Post-mortem.—The lower four feet of the small intestine were much congested; except for the original ulcer which had perforated, there was no sign of ulceration. The Peyer's patches were not inflamed or ulcerated. A culture was taken from the gall bladder by Major Grattan, R.A.M.C., and *B. Paratyphosus* A isolated in pure culture. I append the tests to which the organism was submitted. Major Grattan has kindly supplied me with this information. I am sending this short account as I believe very few fatal cases of this disease have been recorded. It is curious that there should have been only one ulcer. As a rule the *Paratyphosus* A cases met with in Lucknow are of a mild type, but I have seen two fairly severe hæmorrhages.

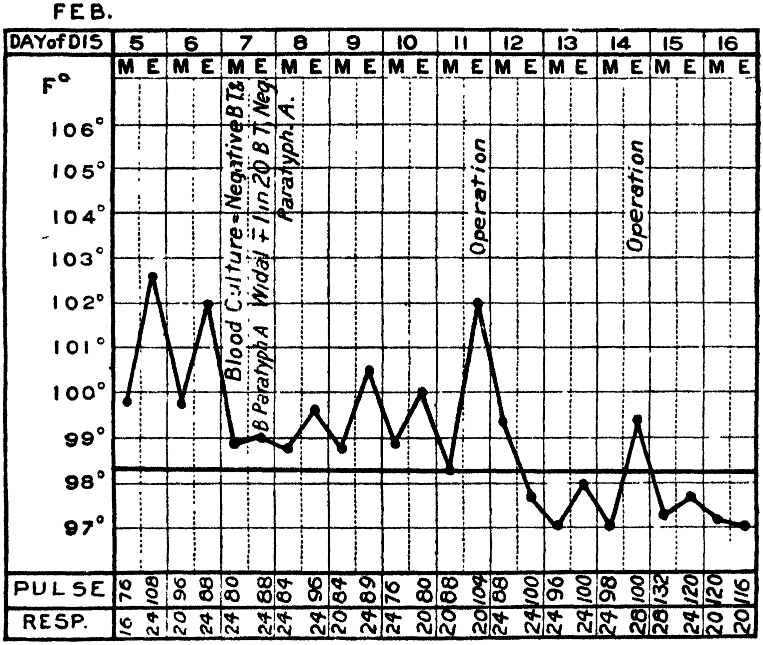
In 1909 when I was on leave a man was operated on for distended gall bladder. He had been suffering from fever of an atypical type for some weeks. He subsequently died, and at the autopsy one ulcer was found in his ileum. He was diagnosed enteric fever though a blood culture taken early in the disease was negative, as also were Widal's reactions and a culture from the gall bladder after death. It may be merely a coincidence that there was only one ulcer in each case. I send a temperature chart of the case. My thanks are due to Major Grattan and Captain Shea for their help and advice.

A pure culture of a Gram-negative motile bacillus was isolated from the gall bladder of Private F., possessing the following cultural characters, after ten days incubation at 37° C.

1 per cent glucose peptone water	Acid and gas.
1 ,, lactose peptone water	No change.
1 ,, cane sugar peptone water	,,
1 ,, mannite peptone water	Acid and gas.
Neutral red glucose agar	Gas.
Peptone water	No indol.
Milk	No clot.

The bacillus was agglutinated at once by a specific *Paratyphosus* A serum.

The bacillus completely removed the agglutinins for *Paratyphosus* A from a specific *Paratyphosus* A serum after two hours absorption at 37° C.



Paratyphosus A serum before absorption with F's. bacillus, tested with stock *B. Paratyphosus* A.

Dilutions .. 10 20 40 80
+ + + ±

Paratyphosus A serum after absorption with F's. bacillus tosted with stock *B. Paratyphosus* A.

10 20 40 80

A CASE OF OSTEOMYELITIS OF THE TIBIA.

By Major J. W. H. HOUGHTON.
Royal Army Medical Corps.

Gunner S. was admitted to the Cambridge Hospital, Aldershot, at the end of June, 1910, having received a kick some days previously on his left shin.

The wound on the leg was opened and fomented, in spite of which he developed acute osteomyelitis of the left tibia, with a high temperature and acute toxæmia. From this he slowly recovered. On September 25, 1910, a skiagram showed sequestration of the entire shaft of the left tibia and the formation of new bone around the sequestrum.

On October 1, under spinal analgesia an incision was made along the front of the tibia and the whole of the necrosed bone was removed in three fragments.

The articular surfaces of the bone entering into the formation of the knee and ankle joints were alone free from the necrotic process, although the cancellous tissues at either end came away with the shaft.

The cavity left by the removal of this dead tissue was packed with gauze and the margins were approximated as far as possible by suture.

The large cavity, however, was slow in filling up, and on March 13, 1911, the upper end was scraped out and an attempt made to draw the skin over the front of the leg by undercutting the edges and stitching them together.

This led to final success, and on May 30, 1911, the patient was able to leave hospital, having perfect movement in the knee and ankle-joint, with a new and strong tibia and fit for duty.

A SEQUELA TO APPENDICITIS.

By Major J. W. H. HOUGHTON.

Royal Army Medical Corps.

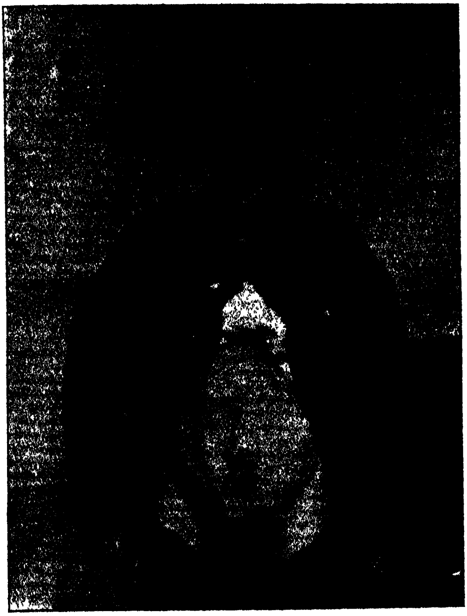
Private A., age 19, was admitted to the Cambridge Hospital, Aldershot, on January 23, 1910, with symptoms of acute appendix trouble. He was placed on the operating table and an abscess in the appendix region was opened and drained. The infection from this abscess, however, had spread to his abdomen and on the third day of his admission, he developed symptoms of acute intestinal obstruction.

He was accordingly again anæsthetized and his abdomen opened in the middle line. A strong constricting band was found, around which several feet of intestine were strangulated. The condition of the strangulated intestine was such as to necessitate excision, and an end to end anastomosis of healthy bowel was made.

The patient's general condition of acute toxæmia, however, was so intense that it was not surprising when this anastomosis broke down and formed a fæcal fistula, which discharged through the opening in the abdominal wall made for the drainage of the appendix abscess.

A month later an attempt was made to close this opening, but without success.

The patient came under my care in June when all his intestinal contents were passed through the fistula and no action of the bowels occurred *per viam naturalam.* After considerable time and trouble had been spent in improving the condition of the skin around the fistula, an attempt to short circuit the fistula was determined upon. The patient was given a spinal injection of stovaine, and the abdomen was re-opened in the middle line. The intestines were found matted together and in some places so intimately adherent to the abdominal wall that separation was impossible. With considerable difficulty the lowest portion of the small gut above the fistula was identified and anastomosed laterally to the transverse colon. This put an end to the irritating fæcal outflow on to the skin of the abdomen and the patient passed his motions *per anum,* but the fistulous opening showed no sign of closure and presented as a pouting circle of mucous membrane through the abdominal wall.



The next step was to close a loop of gut leading to this opening; and later, two attempts were made to unite the skin over the fistula. These failed in their object as the condition of the intestinal wall in the neighbourhood was so rotten that no stitch would hold.

The patient's general health was now good, but he was so troubled by the fistula that it was determined to risk the difficulties of the operation and to excise the opening. This was undertaken on December 11, under spinal analgesia, by wide incisions through the surrounding skin and adhesions.

Four intestinal openings coalesced to form the fistula and were excised. Their abdominal ends were inverted and closed.

One loop of intestine, closed at both ends, was so adherent to an old scar in the mid-abdominal line that its removal was impossible, so its lumen was connected by a lateral anastomosis to a loop of viable gut. Another loop was so short and adherent that neither excision nor anastomosis was possible.

The abdomen was closed and healed *per primam* and the patient left hospital on January 26, 1911. The man is now with his battalion and in excellent health.

His only trouble is a small sinus in the mid-abdominal line which occasionally discharges a clear fluid. This is probably a secretion from the irremovable segment of intestine which was so short and adherent as to defy anastomosis. The sinus will probably close in time as the segment atrophies from disuse.

Of the many points of interest in this case, nothing stands out more prominently than the resisting powers of the peritoneum and the recuperative vitality of a young adult.

A NEW FIRST-AID PACKET.

By Colonel N. ANTELO.
Medical Corps, Argentine Army.

The Surgery of War, having become eminently conservative, the Medical Corps' mission and organization in the field are bound to undergo relative modifications, in order to agree with scientific evolution.

The bistoury is useful only in the most urgent surgical cases in the field at the front and must yield its place to the field dressing.

The dangers that threaten the soldier in battle have been very well formulated by the French surgeon De Santy in the following manner:—

(*a*) Inevitable death from serious visceral lesion.
(*b*) Severe hemorrhage.
(*c*) Infection.

The first is without remedy; the second is in reality very rare on account of the small size of the bullets in present use, with the result that the worst enemy of the wounded soldier is infection, which causes his death or a condition necessitating a further surgical mutilation.

For this reason it is no exaggeration to say that almost the only medical function in field surgery at the front is to avoid infection in battle wounds.

In the time of Pirogoff, the eminent Russian surgeon, it was said that *removal from the field was preferable to dressing* as a first means of aid, and he preferred a body of artisans, able to improvise litters and to make splints for fractures, to ambulance men able to apply dressings.

Pirogoff was right *then*, because the methods of antiseptic dressings were very deficient. The same reason made it necessary to formulate *primary amputation* as a general rule.

Being unable to prevent infection, they removed the wound, thereby saving the soldier's life by aggressive surgery.

Surgical improvements have necessarily modified these opinions, excellent in their day, but now aggressive field surgery is rightly eliminated.

My present purpose is not to exhaust the subject or to quote minute figures. The late Anglo-Boer and Russo-Japanese wars served as an immense experimental field in this direction, and any army surgeon writing about these campaigns acknowledges that the new methods of conservative surgery have produced better results than ever seen before in the treatment of lesions.

The important reports of the North American surgeons Hoff, Havard, Lynch and Braisted, the English Stevenson and the French Matignon, demonstrate quite rightly that abstention from the knife in field surgery is imposed by the facts. The Russian operations in head and abdominal wounds caused a disastrous death-rate, and the Japanese simply folded their hands in analagous cases with remarkable success.

Besides, we now know that the evolution of the wound depends on its first dressing, as rightly said the celebrated Wolkmann.

On the other hand, experience and statistics show us that it is impossible for the medical staff, capable of applying a dressing scientifically, to immediately reach the wounded within the firing lines and sometimes many hours elapse before the soldiers can be helped by attendants.

We arrive inevitably at this conclusion: that the soldier's best safeguard in the face of the dangers of infection *is in his first-aid packet and in his instructions as to its use.*

Rapid evacuation is a very important function of the Medical Corps and its organization should leave nothing undone to achieve that end.

Furthermore, rapid removal and early dressing do not conflict, on the contrary they work into each other.

Under this conviction, army surgeons will take steps to instruct the troops *very carefully* so as to make them, when on the battlefield, the best agents of modern ideas by dressing their own wounds.

Before I describe the first-aid packet which I now present for my colleagues' judgment, it would be well to formulate the following outline as to the principal specifications of the first-aid packet as used at present in the organized armies of the world. I have taken them from the excellent descriptions published by Laval in *Le Caducée's* Collections of 1907-8, accompanied by very clear photographs. Blau's paper is also interesting to consult (*Deutsche mil. Zeitschrift*, 1908, No. 11).

Countries	Date	Size	Weight	Form	Contents of packet	Dressings	Covers
			Grm.				
Holland ..	1903	10×4×1·5	40	Rectangular	2 bandages 4 m. × 9·5 cm. each. To each bandage is attached a dressing, both wrapped in two waxed paper covers, attached by short string sterilized by steam	2: each of compressed wool 10 × 12 cm. wrapped in absorbent gauze	Two of canvas united by a seam; outside inscription about its use.
Germany ..	1906	7·4×5×2·5	25	Square ..	1 gauze bandage 3 m. × 6·5 cm., divided into two at one end; the pad sewed at the other end. Everything impregnated in bichloride, 1 × 2000	1: several layers of gauze, non-compressed, 12 × 6·5 cm., bichloride 1 × 2000	Grey waterproof material secured by crossed thread.
Spain ..	—	11×7·5×2·5	40	Rectangular	1 gauze bandage, 1 triangular sling, 2 dressings, 2 safety pins, 1 cartoon plate	2: of woollen wrapped in gauze 10 × 6·5 cm.	Grey stuff, outside inscription, register and soldier's dates.
Norway ..	—	8×5×2	21	,,	1 bandage, 1 safety pin, 2 dressings	2: layers of gauze 35 × 20 cm.	Grey material, without inscription, secured by four stitches.
Roumania..	—	12×7×2·5	48	,,	1 bandage 5 m. × 6 cm., 2 dressings, 2 safety pins, 1 tag	2: 8 layers of gauze 20 × 14·5 cm. wrapped in wax paper	Greyish gummed material outside inscription.
Austria ..	1906	7×6·5×2	40	Square ..	1 woollen bandage 3 m. × 6 cm., 2 dressings, 1 safety pin	2: layers of gauze wrapped in cambric 12 × 5 cm., one sewed near the bandage's end, wrapped in waxed paper	Grey material crossed by a ribbon whose ends are pressed by lead.
Sweden ..	1903	8·5×6·2×2·5	31	Rectangular	1 woollen bandage 3 m. × 8 cm. 2 dressings	2. each of 8 layers of gauze 8 × 6 cm. and absorbent cotton-pad wrapped in woollen material	Gummed waterproof material, greyish; outside inscription.

Switzerland	1906	10·5×6·5×2	100	Rectangular	1 bandage 5 m., 1 triangular sling, 2 dressings	2: cotton dressings wrapped in vioforme gauze	Metallic box: two inside divisions, one outside ring to open inscriptions in three languages.
Russia ..	—	9·5×5·5×2·5	43	,	1 bandage 3·50 m., 1 safety pin, 2 unattached dressings	2 gauze and cotton 15 × 9 cm. wrapped in thick paper	Bluish-grey material; outside inscription—second inside cover (waterproof rubber)
United States	1906	10×5·7×2·2	130	,,	2 dressings fixed on 2 gauze bandages 1 m. × 8 cm., wrapped in two wax paper covers, bichloride 1 × 1000	2: sublimated layers gauze, each ½ m., strongly compressed and fixed in each bandage	Metallic box: outside inscription, to open, two hooks to hang it on.
Japan ..	—	9×6×3	67	—	1 sling 1·30 m. × 90 cm., 1 safety pin, 3 gauze dressings 25 m. by 24 cm., wrapped in waxed paper	3: gauze dressings ..	Yellow khaki material.
Italy ..	—	6×6×2	30	Square ..	1 bandage 3 m. × 5 cm., 2 safety pins, 2 dressings	2: gauze sublimated dressings 40 × 30 cm. wrapped in waxed paper	Waterproof material; outside inscription.
England* ..	—	—	—	Rectangular	A piece of gauze 1 pad of tow between two layers of gauze, 1 bandage of gauze 4½ yards, 2 safety pins	1	Outside sewn cover and inside waterproof cover; instructions inside and outside.
France and Argentine	—	—	—	,,	1 bandage 4 m. × 6·5 cm., 1 dressing, 2 safety pins	1 piece of sterilized tow wrapped in gauze 27 cm × 9 cm., 1 compress of gauze 45 × 35 cm., 1 piece of waterproof material 30 × 15 cm. Everything impregnated with bichloride of mercury 3 × 1000 and after in carbolic acid 5 per cent.	Waterproof cover with instructions.

* [This is not the latest British first field dressing.—ED.]

[*Note.*—The above measurements are taken from Laval's paper and do not quite agree with those of Blau.—ED.]

In my opinion the first-aid packet must be in accordance with the following requirements:—

(*a*) Have *two* dressings, because about 80 per cent of wounds show two holes.

(*b*) The dressings must be antiseptic and their material absorbent.

The instructions for the Italian soldier's first dressing are in my opinion faulty, viz.: to cover the wound, after having been dressed, with waterproof paper, thus violating the most elementary rules of drainage.

(*c*) The two dressings must be attached to the bandage, to avoid undue handling.

(*d*) Roller bandages are better than triangular. Anyone is able to apply a dressing by means of a roller bandage, but very few can use a triangular bandage properly.

(*e*) The outside covering must be absolute proof against accidental pollution.

(*f*) The packet must be capable of being opened and its contents applied with ease.

(*g*) As a new idea: each packet should possess a little flask with a powerful skin antiseptic : *i.e.*, tincture of iodine.

I consider the requirements as to form, weight and price scientifically of small importance.

None of the packets which we have studied quite fulfil these requirements. Some have only one dressing, others are very difficult to apply and none possess two dressings attached to the bandage.

In the suggested dressing we try to fulfil every requirement, including toward its perfect realization the important element of tincture of iodine.

I shall say but a few words more on this subject. In a previous paper[1] I collected the writings and observations, both foreign and of my own country, to show that tincture of iodine is the best skin antiseptic for army surgeons on account of its rapid efficacy. We can successfully prevent infections of the skin and moreover the vapour impregnating the contents of the packet, after their application tends to maintain an antiseptic action.

This emergency field dressing is made up as follows :—

Dressing No. 1.—This consists of an open-wove bandage 1 metre 20 cm. long; 30 cm. from the end of the bandage is fixed a pad of sublimate gauze 1: 1,000, which is oblong in shape, 12·75 cm. by 9 cm., and which consists of ½ metre of gauze folded into 32 thicknesses. This pad is attached to the bandage by stitches in the middle running across the bandage leaving all the cut edges free. Beyond this pad is fixed another of the same material and dimensions but this one is fixed to a sliding loop of stout muslin by stitches which leave all the cut edges as free as possible. The second pad can thus be moved up and down the bandage as required. These two pads are placed close together and the bandage is folded in accordion pleats, the whole being wrapped in waxed tissue paper and slightly compressed under a flat press.

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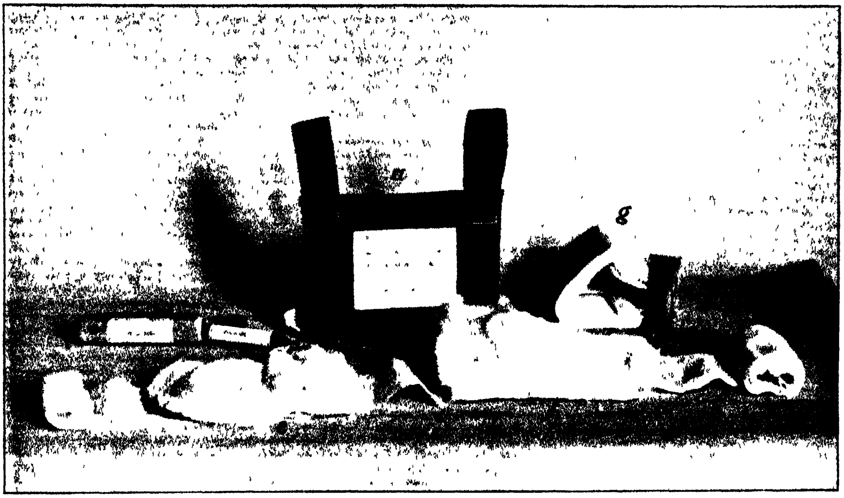
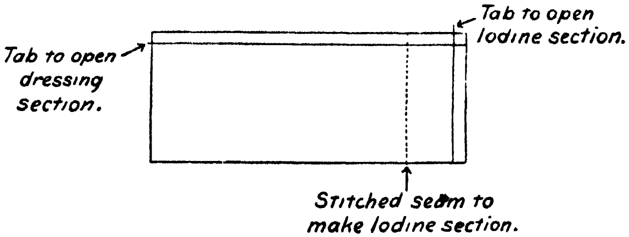
[1] "Tincture of iodine in the Surgery of War," presented to the 19th Annual Meeting of the Association of Military Surgeons of the United States. (Richmond, November, 1910.)

Dressing No. 2.—This consists of a bandage 5 metres long by 7·5 cm. wide, folded in the ordinary way and placed in a small tissue envelope containing two medium sized safety pins; the envelope is placed under the free end of the bandage. The whole dressing is then wrapped in waxed tissue paper and slightly compressed as No. 1.



A NEW MODEL FOR A FIRST-AID PACKET.

(*a*) Outer canvas envelope fitted with two loops ; (*b*) Inner envelope of impermeable material (Jaconet) ; (*c*) Wooden block containing 5-gramme phial of tincture of iodine ; (*d*) Bandage to which is attached : (*e*) One stationary pad of sublimate gauze ; (*f*) One movable pad also of sublimate gauze (pad "f" by means of a loop at the back, can be moved at will up or down bandage "d") ; (*g*) Open wove bandage 3 in. broad and 5 metres long ; (*h*) Two safety pins.


Tab to open Iodine section.
Tab to open dressing section.
Stitched seam to make Iodine section.

Dressings Nos. 1 and 2 are then wrapped together in one package with waxed tissue paper, and the whole is slightly compressed.

To complete the dressing, a small hermetically sealed phial, filed at the neck for opening, and containing 5 grms. of tincture of iodine, is packed in a wooden tube, which is corked top and bottom, and affords protection for the glass phial it contains.

Dressings Nos. 1 and 2 are now wrapped in a Jaconet envelope.

The method of packing these is in accordance with the sketch on page 287.

The waterproof envelope is sealed by folding the Jaconet edge upon itself, and fixing it with adhesive tape, which must be continued past the end of the edge and folded back, so as to form a tab for the ready opening of the packet.

The whole dressing thus enclosed in waterproof material, is now placed in a khaki cloth envelope 14·5 cm. by 10·75 cm. opening at the longer upper side, having a flap secured with a spring glove button. To this envelope are attached two loops made of the same khaki material of suitable size to attach the dressing to the belt. The whole finished package must be tight and firm, and is labelled as follows on the side opposite to the spring fastening:—

Paquete de curacion individual,
Modelo Dr. Antelo
(Coronel de Sanidad del Ejercito, Argentino),
Confeccionado por la Cassa
Burroughs Wellcome and Co., London (Eng.)

The weight of the complete dressing is 107 grm.

The photograph shows the packet and its contents, but I believe that it would be well to add some words about two of its particulars:—

(1) The outside cover; (2) the way of attaching the dressing to the bandage.

(1) It is doubtless true that a metal covering is the best means of keeping the contents of the package pure. But there is a disadvantage involved—i.e., it is very difficult to open the packet in spite of the rings and the keys.

I have experimented with the North American model and my impression is that a certain dexterity and patience are necessary to open the metal cover, and even in my own case I was somewhat badly scratched by the rough edges when handling it.

Moreover, this packet, one of the best I have ever studied, has the dressing gauze very much compressed, which necessitates much handling by the soldier.

The outside covering of the Swiss packet has the same disadvantage, to which is added that of the sling.

(2) Our design is to attach the dressing to the bandage, thereby considerably facilitating its application. One dressing should be attached near the end of the bandage, and the other one arranged to slide over it without much handling, so that two dressings can be applied to the wounds, wherever they may be situated.

The gauze is abundant, in order that this packet can be used as a permanent dressing; it thus represents a considerable stock of suitable material which could be used by surgeons immediately after a battle, if the regular stock were exhausted.

I should have liked to suggest the impregnation of gauze by tincture of iodine as recommended by Major Frank Thomas Woodbury. "Some Further Observations on Iodine as an Antiseptic," by Major Frank Thomas Woodbury, Medical Corps, U.S.A. *New York Medical Journal*, February 11, 1911. This is however impossible, as iodine evaporates very rapidly.

Report.

AN EXPERIMENTAL MARCH TO INVESTIGATE THE AMOUNT OF FOOD REQUIRED BY MEN ON ACTIVE SERVICE.[1]

(1) The Experimental March was begun on October 10, 1909, the party being composed as follows: Twenty men of the Loyal North Lancashire Regiment, with Captain Body of the same regiment in command; three men of the Army Service Corps, as drivers of transport: a corporal and two men of the Royal Army Medical Corps; Lieutenant-Colonel C. H. Melville and Major W. W. O. Beveridge, D.S.O., of the Royal Army Medical Corps, representing the Advisory Board, and Captain N. Dunbar Walker, Royal Army Medical Corps, in direct medical charge of the party.

(2) All men and officers, with the exception of Captain Body, were volunteers. The men received a consideration of 1s. 6d. and the non-commissioned officers 2s. 6d. a day. Officers drew their usual field allowances.

(3) The transport accompanying the party consisted of one General Service wagon, one ambulance wagon, one filter water-cart and six horses.

(4) The party was provided with single-fly bell tents, five men being accommodated in each tent, and straw was issued after October 12. A tent was provided for each officer, and in addition one tent as an officers' mess tent, and another for medical inspection, weighing, &c.

(5) The party paraded at the Medical Inspection Room, Tidworth Military Hospital, at 9 a.m. on October 11, and the individuals composing it were carefully weighed, measured (circumference of chest, of abdomen at navel, and of right calf), and their pulses and blood-pressures recorded.

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[1] Under the supervision of the Research Committee—Hygienic Section, Army Medical Advisory Board.

This was carried out by the three medical officers of the Royal Army Medical Corps accompanying the party, assisted by Dr. J. S. Haldane, F.R.S., and Dr. M. S. Pembrey. A start was made at 11.30 a.m., and the party marched to West Down North Camp, which was its base till the afternoon of the 18th.

(6) The original camp at West Down was left on the 18th, and a short move made to Rolleston Camp, where that night was spent. On the 19th the party marched to Perham Down, and on the 23rd returned to Tidworth, where the final measurements and observations were made as on the 11th by the same observers. Daily observations of the weight of the men and of the meteorological conditions were made, and on the 17th, being Sunday, in addition to the weights of the men, their measurements as on the 11th, pulse-rates and blood-pressures were recorded. The men were weighed on all occasions in their trousers, drawers, and socks, after breakfast. This was necessary, since it was considered inadvisable to strip the men under the unfavourable weather conditions prevailing, or to keep them waiting for their breakfasts till the operation of weighing had been completed. On the 12th and 17th the men were weighed in addition in their full marching order; the mean of these two weights has been taken as the basis for calculation of the total work done on the march. Details of the weights and other measurements are recorded in Appendix II.

(7) The daily weighing took place, as a rule, at 9 a.m., and as soon thereafter as the men could put on their equipment the start took place. The distances marched are shown in Appendix IV, where, also, the vertical distance climbed is recorded. The course of each march was traced on the Ordnance map, 6 in. to the mile, as a rule immediately after the return to camp, by all officers in consultation. The distance traversed was then measured by a wheel map-measurer, and the elevations estimated where possible by the bench marks recorded on the map, or, where these were not available, by the balanced opinions of the officers in consultation. Since the completion of the march these routes have been very carefully copied on to clean map sheets by Lieutenant-Colonel C. H. Melville and Captain N. Dunbar Walker, and the distances and heights more carefully measured. A few discrepancies were discovered, due to the fact that the original estimations were made by very uncertain candle-light. The present figures have been very carefully worked out, and it is probable that the heights recorded are, if anything, underestimated, small undulations on the Downs not being marked on the maps and forgotten in the retrospect. The record as at present given is probably as accurate as any could be, short of a special survey. The maps are available for inspection at any time. The diary of the marches and of the weather experienced is given in Appendix I.

It may here be briefly stated that the weather conditions were as unfavourable as they could well have been. Rain fell on almost every day, and heavily on most days; and it is no exaggeration to say that neither men nor officers slept in dry beds or put on dry underclothing at any time throughout the duration of the experiment. The weather was fortunately warm, and the camp grounds, except on the 11th, 12th and 18th, well sheltered from the wind.

(8) The behaviour of the men composing the party was excellent. There was no trouble of any kind, and the conditions of the experiment were loyally and thoroughly observed by all. Lieutenant-Colonel Melville has desired the Committee to record most emphatically his opinion, which is shared by Major Beveridge and Captain Walker, that the success of the experiment depended almost entirely on the very loyal and hearty support given to them by Captain Body.

(9) The health of the men was excellent throughout. At the end of the first week fifteen out of the thirty individuals composing the party complained of sore gums. (This subject will be returned to later.) One man ate the berries of the Woody Nightshade (*Solanum dulcamara*) on October 15, and suffered from faintness with subsequent urticarial rash. A good many men suffered from sore feet, and there was a trifling amount of intestinal disorder. No serious illness of any kind declared itself.

(10) The equipment worn by the men of the Loyal North Lancashire Regiment was the Web equipment, 1908 pattern. The total dead weight carried by these men averaged 54 lb. (24·55 kg.). The other men (Royal Army Medical Corps and Army Service Corps) carried the regulation field equipment belonging to their corps. The weight carried by the Royal Army Medical Corps averaged 26 lb. (11·81 kg.); the Army Service Corps, who were mounted, carried on an average 20 lb. (13·63 kg).

The officers, with the exception of Captain Walker, wore field equipment, the weight carried being:—

Lieutenant-Colonel Melville	31 lb. (14·09 kg.)
Major Beveridge	18 „ (8·18 „)
Captain Body	24 „ (10·90 „)

Captain Walker carried the same equipment as the men on most days, but on several occasions wore other patterns, including, on one occasion, the German M./87 equipment. Some interesting information was obtained in this manner, but it lies outside the scope of this report.

(11) *The Rations.*—Detailed analyses of the rations issued are given in Tables, Appendix III, and it will be convenient to consider these first from the point of view of the foodstuffs actually issued, and later from that of the dietetic principles included.

(12) *Meat.*—The meat portion of the ration during the first week of six days consisted of 1 lb. nominal of corned beef; during the second of 1¼ lb. of fresh meat (beef). The former was of fair to good quality, the

tins varying considerably. On one occasion in the officers' mess a mass of fascia was found in the cooked beef, equivalent to one-quarter of the total content of a tin. Occasionally the meat was coarse in fibre. Fat was never excessive, probably about 10 to 13 per cent of each tin; certainly not more than the latter figure. In regard to this latter ingredient, it is to be noted that when tinned meat and biscuit are issued the total amount of fat furnished by the ration is in the tinned meat, neither the biscuit nor the vegetable ration containing any serious amount of this principle. Since the pound is a nominal pound, the meat actually received by the soldier amounts to not more than 12 oz. (336 grm.), and the actual amount of fat comes to 50 grm. During the second week, when fresh meat was issued, fat was much more abundant, the meat being what may be termed "medium fat," containing certainly much more fat than it would be wise to anticipate in the class of meat likely to be available on active service. For an estimate of its energy value, Atwater and Bryant's figures for "Side of beef, medium fat, as purchased," may be taken; they give 18·1 per cent of fat. The fresh meat ration is 1¼ lb. (567 grm.), containing, on the above calculations, 102·6 grm. of fat—that is, more than twice as much as that contained in the ration of the first week. These figures accord well with the experience of the medical officers concerned in the experiment. There was during the second week a fairly plentiful supply of dripping, which was much appreciated, for there was none available in the first week, and more dripping would have been welcomed. Since all the fat furnished by the ration was contained in the meat issue, and under the most favourable conditions this was felt by those depending on it to be insufficient, it is fairly obvious that, with the inferior class of fresh meat likely to be the only available kind on active service, the allowance of this important source of energy would be even more lacking. It has already been noted that the tinned meat was occasionally somewhat coarse; this was felt more particularly when it was eaten uncooked. The fibres got between the teeth and dragged on the gums, and it is noteworthy in this connexion that fifteen out of the thirty officers and men of the party complained of soreness of the gums at the end of the first week. This, as will be shown later, may be due in part to the hardness of the biscuits issued; but the toughness of the meat, and perhaps the presence of nitrate of potassium in it, undoubtedly played some part in its causation. It is impossible that scorbutic symptoms could have developed in such a short time, since green vegetables were issued on the 11th and and 12th, and the first complaints of sore gums were made on October 14. The quality of the fresh meat was, on the whole, good; on one occasion (October 18) excellent. On the 19th and 21st it was very tough and coarse in fibre, and in consequence about half was left unconsumed by the officers on the former date. Here, again, it must be noted that even this meat was superior to that which might be expected on active service.

(13) *Bread Stuffs.*—The biscuits supplied were wholemeal biscuits, of good quality and well baked; eight, weighing rather over 2 oz. each, formed a day's ration. These biscuits are, in the opinion of the Medical Officers taking part in the experiment, too hard, and it is in part to this quality that they attribute the fact that fifteen out of the thirty members of the party complained of sore gums at the end of the first week, the stringy nature of some of the meat probably also playing a part, as already noted; two teeth were also broken by two of the men when they were biting their biscuits. Apart from this the biscuits were much appreciated by the men, who preferred them to the bread ration, subsequently issued, as being "more filling." As regards the officers and some of the Royal Army Medical Corps men the reverse was the case, the biscuits being the only article of the ration during the whole course of the experiment that was left uneaten. The average surplus remaining was two and a half biscuits per officer per diem, or more than a quarter of the ration. This may in part, perhaps, be attributed to the fact that the officer comes from a class less accustomed to the consumption of large quantities of carbohydrates than that to which the men belong prior to enlistment. It is probable that on a longer trial the officers would have gradually acquired the habit of eating all their biscuits. The bread supplied was of excellent quality, and much more appreciated by officers than by the men, possibly because the former had been somewhat starved of carbohydrates during the first week.

(14) The *Vegetable Ration* consisted of 8 oz. green vegetables (cauliflower, parsnips, carrots and onions) on the 11th and 12th. On the remaining days potatoes of very good quality were issued. The first point to draw attention to is, that in the Regulations potatoes and green vegetables are apparently looked on as articles that can fitly be substituted in equal weights the one for the other in a dietary. It is hardly necessary to emphasize the fallacy contained in this. The energy value of 8 oz. of potatoes is 154 Calories, that of 8 oz. of cauliflower (issued on the 11th) is only 70 Calories, that of 8 oz. of mixed vegetables (carrots, parsnips and onions, issued on the 12th) is 117·2 Calories. Thus on the two days taken together on which green vegetables were issued, each man received in respect of this constituent of his ration only 187 Calories instead of 308 Calories, which he would have received if potatoes had been provided. The Committee are of opinion that the Regulations should state distinctly that the 8 oz. of vegetables should not be green vegetables.

It is obvious that in war green vegetables could only be issued occasionally, being non-portable. When available they should be issued not as an integral part of the dietary for any food value they may possess, but as an extra ration, and purely on account of their anti-scorbutic qualities.

(15) The *Ration of Jam*, which was of excellent quality, was issued in 1 lb. tins. The first point to note is that this is a nominal weight, the

amount of jam actually supplied was 12·5 oz., so that the ration per man instead of being 4 oz. was in reality little more than 3. The Committee are of opinion that this point needs serious attention. They quite recognize the necessity of dealing with nominal instead of actual weights for trade purposes and for mobilization tables, but as will be seen the practical effect is that the soldier loses 3 oz. of his tinned meat and 1 oz. of the jam of his ration in consequence. If nominal weights are a necessity, as they undoubtedly are, the loss of food so occasioned should be made up in other directions. They are of opinion that in this particular instance the ration might be increased to ½ lb. (nominal), or one tin for every two men. Each man would then get 6¼ oz. instead of his nominal 4 as at present.

(16) The *Sugar, Salt and Tea* contained in the grocery ration were excellent. The only comment that the Committee feel inclined to make is on the inclusion of the salt in a paper packet with the sugar and tea. The salt being exceedingly hygroscopic is apt to damage the other constituents of the ration once it is opened. It is suggested that it might be of advantage if some modified form of salt, so manufactured as to get rid of its hygroscopic qualities, were substituted. On the subject of the grocery ration the Committee are of opinion that mustard might with great advantage be included. This condiment is an undoubted aid to digestion, especially in the case of somewhat insipid meat.

(17) *Tobacco* was issued to men asking for it, but the majority of the men preferred private supplies. The brand issued was good, but too strong. The men who used it complained of this. It is worth noting for future information that the taste of the class from which the men were drawn seems to have changed distinctly in this matter. Instead of the old-fashioned high-flavoured tobaccos they seem to prefer a lighter variety. A tobacco too strong for the taste of the individual using it is apt to cause digestive disturbances. No restrictions were placed on pipe smoking, but cigarettes were prohibited on the march and restricted to two or three a day in camp.

In the Allowance Regulations, rum, 2½ oz. is allowed to be issued on the recommendation of the Principal Medical Officer. Advantage was taken to issue this ration on the 16th, Saturday, owing to the depressing weather conditions. Again, on the 20th, after a very severe march in drenching rain, whisky to the same amount was purchased and issued, rum not being obtainable. With the above exceptions water only was drunk by the party.

(18) *Protein.*—Coming now to the dietetic principles included in the ration, it will be seen from Appendix III that the average amount of proteid actually furnished to each man was 190 grm. in the first six days, and 145·36 grm. during the remainder of the march. The former figure certainly demands no increase, and probably the latter is also sufficient. This accords well with the feelings experienced by the officers and men

of the party. Only two professed a desire for more meat, while in some cases at least, more particularly among the officers, a distinct loathing was felt for the meat ration towards the end of the first week. It is possible that this loathing was not entirely due to the amount of proteid consumed, but partly to the monotonous form of food stuff in which it was furnished.

(19) *Fat.*—The average amount of fat supplied was about 50 grm. in the first six days, and 110 grm. in the latter half of the march. It is obvious at once that there is a great deficiency in the figure for the first week. As regards the second week, 110 grm. of fat are undoubtedly a fair average. It must not be forgotten, however, that it is a maximum figure. "Sides of beef, medium fat," do not grow on the ordinary cattle met with on service. At the same time, too, it must be remembered that, as already stated, the lack of fat in the rations was strongly felt throughout, not only during the first, though most markedly in that period of the experiment, but also later. Nor was this sensation of a deficiency of fat limited to the period of the experiment. For at least one week after its termination a desire for fatty foods was strongly felt by the officers who had been taking part in the experiment.

(20) *Carbohydrates.*—The amount of carbohydrate furnished in the first week averaged 505 grm., and during the second week 450 grm. It must be noted that though the ration of biscuit is laid down at 1 lb., the eight biscuits actually supplied about 1 oz. more. The ratio of carbohydrate to fat in the first week was as 10 to 1, a proportion noted only in the diets of the poorer classes. In the second week it was raised to a more reasonable level, about 4½ to 1, but here, again, it must be remembered that the fat has been calculated on a scale that it would be unreasonable to expect on active service. There was a marked craving for sugar, especially amongst the officers. Whether this was due to an actual "starvation" in this direction, or to the desire for some relief to the monotonous nature of the rations, is uncertain. This craving for sugar is a well-known effect of service conditions, and might be met by an increase in the jam ration, as already suggested.

(21) The average energy value of the ration issued was 3,489 calories gross. This cannot be considered a sufficient supply of energy for men supposed to be undergoing even moderate hard work, more especially when they are liable to have sudden demands made on their physical powers. It is slightly less than the standard laid down by Atwater for moderate work, and 1,000 calories less than that for hard work. It is not much more than the food supplied during peace, and is less by 750 calories than that supplied to convicts in England at hard labour. (Further comparisons can be made by means of the table on p. 101 of the Third Report of the Committee on Physiological Effects of Food, &c.)

(22) The experience of the officers and men actually taking part in the experiment is worth recording. As already stated, the officers and

some men of the Royal Army Medical Corps found the biscuit ration excessive, and felt also the lack of fat. The meat was found sufficient, and though all were tired of the corned beef by the end of the sixth day, this was more the result of monotony than of too great a quantity. There was a distinct craving for sugar. As regards total sufficiency, all officers felt that they were not getting enough to eat. This was sufficiently obvious in their faces, which were distinctly hollowed. Their health did not suffer, except in the case of Captain Body, who complained of a hacking cough, due to a relaxed throat, and uvula, and of sleeplessness, during the last seventy-two hours of the experiment. Two of the men said they had had enough to eat, one just enough, and one enough in the first week and not in the second. Here, too, the appearance of the men was most significant. In two cases, Privates Andie and Mostyn, the hollowed cheeks were most noticeable. Eyes were also rather sunken in the head. Only two men said decidedly that they wanted more meat; without exception they all wanted more bread and in some cases more biscuits. There seemed a general consensus of opinion that the food in the second week was less filling than in the first. This was possibly due to the fact that the bread was eaten almost immediately after issue, whilst the hard biscuits took longer to eat, and a reserve was therefore kept. The craving for fat and sugar was not apparently so great as in the case of the officers. Leading questions usually elicited a desire for fat, but this is a weak argument. The private soldier is rather apt to give the answer that seems most likely to please. On the whole there was practical unanimity as to the insufficiency of the ration. The insufficiency being in the direction of fats and surplus sugars in the case of the officers, and carbohydrates in the case of the men. It is a trivial point, but the mere fact that the march was christened unofficially in the Southern Command Staff Offices "the Hunger March," points to a feeling that the ration would not prove to be excessive, at the least.

(23) *Nature and Amount of the Work Done.*—The details of the marches, halts, &c., are given in Appendix I, and the diary of the march, and the total equivalent of the external work expressed in heat units in Appendix IV. Internal work has been estimated at 3,000 Calories per man per day. This somewhat high figure has been chosen on account of the fact that, quite apart from the marching, the exigencies of camp life demand a considerably greater expenditure of energy than an ordinary sedentary existence. For instance, in the camp grounds occupied at West Down during the first week of the experiment the latrines were ¼ mile distant from, and in a hollow 50 ft. below the camp. The kitchen was also at some distance, and food had to be fetched. Then the work done in moving camp by hand on the forenoon of the 13th, which occupied about three hours of somewhat heavy fatigue, the striking, packing, and loading of the tents and camp gear, followed by unloading and pitching, performed twice on the 18th, altogether about

four hours' work, and the striking, packing and loading, about one hour's work, on the 19th, have not otherwise been estimated. Lastly, it must be remembered that a great deal of the marching was executed over rough grass, or rough and muddy roads, with, on the occasion of the two longest marches, the addition of a heavy gale with persistent driving rain. Taking all these facts into consideration, it has been felt that the figure given for internal work does not do more than compensate for the additional exertions of camp life, the adverse conditions under which so much of the work was done, and the occasional fatigues.

(24) But, while making these allowances, it must be acknowledged that the total work done was by no means excessive, in view of the exertions that may fairly be expected on field service. The tents had not to be struck and pitched every day, there were no guards or outposts to be provided, and, most important of all, perhaps, the smallness of the party saved the men from the incessant checks, so common when large bodies of troops move along a road. They were saved, too, from the dust and increase of moisture in the air that affects so importantly all but the men at the head of a long column. Except on the 15th and 20th the marches were not long. It might have been advisable to press the men somewhat more with longer marches, but the shortness of the days and the bad weather militated against this. In addition, in a first experiment of this nature it seemed best to feel one's way somewhat cautiously. The fact remains that the total energy demanded of the men forming the party was not equivalent to the energy that they might fairly be expected to furnish under normal service conditions; not equal, that is, to the amount of energy that a well-reasoned war ration might be expected to supply.

(25) *Weights of Men.*—In considering these it will be convenient to begin with those of the men of the Loyal North Lancashire. These form a homogenous body of men, carrying approximately the same weights and performing the same work. They were taken from ninety-six volunteers; no special selection as regards habits or physique was made, but only men physically fit for active service were chosen. It would unnecessarily complicate the results to include with these the figures for the men of the Army Service Corps who rode, or those for the Royal Army Medical Corps who, though they marched, did not carry the same load as the Infantry men. The same applies to the officers with the exception of Captain Walker. It will be convenient, therefore, to consider the men of the Infantry detachment separately, as forming the ground material of the experiment, the figures for the other members of the party being used merely to illustrate and control these.

(26) These figures are shown on Tables I, II, III, Appendix II. The point that at first strikes one about these figures and curves is the initial general rise in weight, followed by a subsequent and much greater fall. In all three curves it will be noticed that the initial rise attains

a maximum on October 14, the fourth day of the experiment. In the case of the main party this maximum is extended over three days till October 16, but in the other two curves the rise is only ephemeral, and followed at once by a fall. In the case of the main party, as well as in the case of the officers, there was a slight rise on the 18th, following on, and doubtless attributable to, the Sunday rest. It is to be noted that though the average curve of the main party comes to a maximum on the 14th, only three men actually attained their maxima on that day, whilst four showed their highest figure on the 16th. The earliest date on which a maximum was shown was the 11th (first day of march), and the latest the 20th. Two men who showed maxima on the first day showed also the greatest loss of weight on the whole march. There does not seem to be any fact in common connecting these men with the steady loss of weight that they showed. There seems to be some connexion between late attainment of a maximum and ultimate gain of weight. As to the actual causes of this marked gain in weight, affecting as it did all the men taking part in the march, it is difficult to pronounce decisively. It is possible, at least, that some is due to increased amount of fluid drunk. The unwonted exercise, and the fact that the men were on salt beef and biscuit during the first week, might account for an unusual consumption of fluid. It must be stated that the men were not allowed to drink on the march, except when they ate, or by special permission. An increased consumption of fluid would therefore occur, if it occurred at all, in the tents, and be unnoticed. This matter will be discussed more at length later.

(27) There is no marked difference as regards the extent of this rise between the three classes represented in the curves, though the officers and the men of the Royal Army Medical Corps were not in so good training as the men of the Loyal North Lancashire. Captain Walker, who was in good condition, and carried the same weight as did the men of the main body, showed the initial increase more markedly than any other officer. Captain Body, who was in good condition, being, in fact, rather overtrained at the start, showed a marked rise on the 13th and 14th, after a sharp drop on the 12th. On the question of increased fluid, Captain Walker is of opinion that he did not drink more than usual at the outset of the march. A rise is shown on the curves referring to the officers and the detachment, Royal Army Medical Corps, on the 21st. This rise is due, in the case of the officers, to an increase in weight of 0·85 kg. on the part of Lieutenant-Colonel Melville; and as regards the men of the Royal Army Medical Corps, of 1·10 kg. on the part of Private Boxall, who was sent back to camp after the first halt on the 20th, and was therefore practically resting on that day.

(28) The subsequent fall is well marked throughout, and dates, as will be seen, from the end of the sixth day of the march in the case of the main party. Taking the two weeks separately, it will be seen that in the

first week thirteen men gained weight and seven lost. Of the seven who lost, three showed maximum weights on the first day of the march and two on the second. The loss in these cases, therefore, was progressive from the first. In the second week two men only gained weight and the remainder lost. The average gain in the first week per man throughout the party was 0·32 kg., the average loss in the second week 1 kg. Taking the whole period, five men gained in weight and fifteen lost, the balance of loss being 0·69 per man. The balance of loss over the whole party from the 14th, the day of maximum average, to the end of the march was 1·14 kg. per man.

(29) The men who gained weight were all light men, with one exception, Lance-Corporal Cooke, who gained fractionally only. Three of the others were Nos. 16, 18 and 20 in order of weight in the party, and the remaining man was No. 13. The exceptional man, Lance-Corporal Cooke, attained his maximum weight somewhat rapidly on the 14th, having gained in that time 1·60 kg. on his original weight. He fell 0·60 kg. on the next day, but after that remained practically stationary till the 10th day, after which he fell, though never to his original level.

It is interesting to note that all the men who showed an increase in weight over the whole period, with the exception of Private Pushman, lost weight in the second week, and showed a general downward tendency over this period. The daily average loss of the whole party from the 14th (the average maximum day) to the 23rd was 0·13 kg. per man. If we take each of these five men who gained over the whole period we find that their daily loss, dating from the day on which each attained his maximum weight, was as follows: Lance-Corporal Cooke, 0·14 kg.; Private Cooper, 0·14 kg.; Private Flynn, 0·14 kg.; Private Judge, 0·27 kg., and Private Pushman, 0·9 kg. It would appear, therefore, that with these men it was more a question of an increase in the initial rise than a diminished loss once that loss had begun. The maximum was also delayed to the 15th day in two cases, and to the 16th and 18th in two others, Lance-Corporal Cooke being the only man whose maximum agreed in date with that of the average of the party.

(30) Referring now to the officers and men of the Royal Army Medical Corps, it will be noticed that the highest average weight was noted in both cases on the 14th, as in the case of the main party. Two only of the officers, however, showed their maxima on that date, the other two being heaviest on the first day of the march. Of the Royal Army Medical Corps two men attained their maximum weights on the 14th and one on the 15th. Here there seems no relationship between early or late attainment of a maximum and subsequent total loss of weight. Major Beveridge, who had been to a certain extent training prior to the march, and who weighed heavier on the first than on any subsequent day, lost only 2·03 per cent of his weight, whereas Lieutenant-Colonel Melville, who attained his maximum on the 14th, lost 4·32 per cent. On the other

hand, there is marked correlation between original weight and subsequent total loss, Lieutenant-Colonel Melville and Captain Body, the heaviest, losing more than Captain Walker and Major Beveridge. As regards the men of the Royal Army Medical Corps, no connexion can be drawn in either direction.

(31) As regards officers, the average daily loss of weight between the date of maximum weight and the close of the march was 0·25 kg., that of the detachment, Royal Army Medical Corps, 0·18 kg. As regards individuals, Lieutenant-Colonel Melville lost 0·37 kg. per day, Major Beveridge 0·09, Captain Body 0·28, and Captain Walker 0·25 kg. per day, starting in each case from the day of maximum weight. These losses are in all cases greater than those of the men of the main body similarly calculated, and may be accounted for by the fact that the change to camp life was greater for the officers certainly, and perhaps also for the men of the Royal Army Medical Corps, than for the men of the Loyal North Lancashire Regiment.

(32) In conjunction with the change in weight may be taken the variations in the measurements of chest, abdomen and calf. At the outset, however, it may be said that these measurements must be taken as having only a general value. In regard to the abdomen in particular, the girth varies so much with the posture of the man that very little reliance can be placed on any isolated figures. The chest and calf measurements are more reliable, but, even here error is not unlikely to creep in unless the tape is handled by the same observer on all occasions. With the above proviso, and taking only a general view of the measurements, considerable information of a useful nature can be got from them. The results of the measurements are shown in Appendix II. It will be seen that in the first week there was a general loss in chest measurement, with an almost equal increase in abdominal girth and in calf measurement. In the second week the loss in chest measurement was even more marked, and there was also a distinct diminution in abdominal girth, while practically an equal number lost and gained in calf circumference. Over the whole period there was distinct loss in chest measurement, a loss not so well marked in abdominal girth, and a definite increase in calf circumference. So far we have been considering only the numbers affected as regards change in either direction. If we take the net average amount of gain or loss we find that in the first week there was as regards chest measurement an average loss of 0·56 in., a gain as regards abdominal girth of 0·54 in., and of calf circumference of 0·22 in.; during the second week a loss of 0·42 in. in chest measurement, of 1·01 in. in abdominal girth, and of 0·16 in. in circumference of calf. Over the whole period there was an average loss of 0·98 in. in chest measurement and of 0·47 in. in abdominal girth, whilst there was an increase of 0·06 in. in circumference of the calf. Comparing these with the measurements of the men of the Royal Army Medical Corps, we find that these latter showed a decrease of 1·46 in.

in chest measurement in the first week, of 0·58 in. in the second week, and of 2·04 in. over the whole period. In respect of abdominal girth they present an increase of 0·958 in. in the first week, a decrease of 0·25 in. in the second week, and a net increase of 0·708 in. over the whole period. The circumference of the calf showed an increase of 0·125 in. in the first week, of 0·083 in. in the second week, and of 0·208 in. over the whole period. These figures tally fairly closely with those of the men of the main party. There is the same loss throughout in chest measurement, the same gain in the first and loss in the second week as regards abdominal girth, and the same gain in the first week and over the whole period as regards circumference of the calf. Even keeping in mind that these measurements can only be considered as approximately correct, we still have the same facts revealed as coming prominently to the front as in case of the weights. These are a gain on the whole in the first week, followed by a greater loss in the second; that is a net loss over the whole period.

(33) *Discussion of Weights and Measurements.*—As already pointed out one of the most evident features of the experiment is that although over the whole period the average body weight fell markedly, there was a clear rise during the first three days, followed by two days over which the weight was about stationary. After this the body weight fell progressively, except for a slight rise on the Monday morning after the Sunday's rest.

(34) Slight rises and falls in weight might be due to accidental causes, such as the small amount of clothing in which the men were weighed being more or less damp from the constant rain, the interval after breakfast and before weighing varying a little on different days or a general tendency to constipation which was actually noticed during the first day or two. The average rise in weight is, however, too general and regular to be wholly accounted for in this way. That an excess of solid material, such as fat, was stored up in the body during the first days of the experiment is also too improbable to be worth discussing. It seems practically certain that the increase of weight was due mainly, if not entirely, to retention of water in some form. It is, of course, conceivable that thirst induced by the salt (about 12 grm. per day of sodium chloride and potassium nitrate) in the ration of tinned meat caused not merely an increased ingestion of water, but also an excessive retention of water in the tissues. As, however, the latter salt is rapidly excreted, and has a diuretic effect, so that the increased excretion of water balances the increased ingestion, this explanation of the increased weight is not very probable, particularly as the weighings on each day were made some fifteen hours after nearly all the ration of meat was eaten. This is, however, a matter for further investigation.

(35) It seems most probable that the increase of weight was really due to retention of water in the form of muscular tissue, and that this increase was sufficient to mask the loss due to an excess in consumption

over the intake of fat and carbohydrate. It is well known that muscular work tends to produce a rapid increase in size of the muscles which are exercised, so that men who are in training commonly increase in weight in spite of loss of fat. The ration contained at the time an abundance (about 190 grm. per day) of the protein material required for the building up of muscle; and the measurements of the calf indicated that the muscles of the legs increased in size. Human muscle contains about 20 per cent of its weight of protein, the rest being almost entirely water. Hence if about 70 grm. per day of the ingested protein had been retained during the first three days and converted into muscle, the increase of weight from this cause would have amounted to 1,050 grm., and would have sufficed to account for the actual gain of 650 grm., even if 400 grm. of glycogen, fat, &c., had been lost. If the growth of muscle ceased (except perhaps at the expense of other muscle) after the first three or four days, and wasting of muscle established itself in the next three or four days in consequence of deficiency of food, the actual variation in weight would be accounted for; and we think that this explanation may at least provisionally be adopted although further investigation is clearly desirable.

It is to be noted that the proteid ration consumed in the first three days averaged 195 grm., as against 140 grm., which is the average consumption in barracks. The carbohydrate consumption similarly rose from 414 to 510 grm. (The figures for consumption in barracks are taken from the Third Report of the Committee on the Physiological Effects of Food, &c.)

(36) If, however, the ration was insufficient from the outset, why should there be an increase of muscle at first and not later? As will be seen from the Table in Appendix V, the calculated average daily deficit in the energy forming material of the ration amounted to about 891 Calories or 982 Calories apart from the Sunday rest. During the first two or three days this deficit was probably met partly by using up the comparatively small stock of glycogen stored up in the liver, muscles, &c., and partly by using up fat. We know from feeding experiments that as long as there is a sufficient supply of glycogen or other carbohydrate, the consumption of protein may be reduced to a minimum, but that as soon as the carbohydrate supply is deficient the minimum consumption of protein is largely increased, although an abundant reserve of fat is still present in the body, or fat in abundance is given in the food. It is thus only to be expected that retention of protein for the purpose of muscular development would cease, with an insufficient ration, as soon as the pre-existing stock of glycogen was used up. We also know that on an insufficient diet, combined with muscular work, the muscles, as well as the fat, begin to waste. In other words, the energy of the body is supplied partly at the expense of the muscular substance and not entirely at the expense of fat and such carbohydrate as is available. In the case

of an underfed horse doing much work this muscular wasting is very evident. It is therefore to be expected that any initial gain in muscle would soon be converted into loss with an insufficient ration.

(37) During the last five days of the experiment the average daily loss of weight was 234 grm., or just over ½ lb., in the case of the twenty men of the Loyal North Lancashires and 334 grm., about ¾ lb., in the case of the four officers. If the daily loss of 234 grm. had been due to fat alone, the energy loss thus represented would have amounted to $234 \times 9{\cdot}3 = 2{,}176$ Calories, whereas the calculated energy deficit was only 890 Calories over these days. The loss of weight was thus not due to fat alone; a large part of it must have been due to loss in muscle and perhaps other fleshy parts such as the liver, which wastes rapidly in starvation. We can form a very probable idea of how the loss was composed from the results of a seven days' starvation experiment recently recorded by Benedict, the subject of the experiment (a man of about 30 kg.) being inside a respiration calorimeter so that his losses were severally measured. During the seven days his average daily losses were as follows:—

Daily loss of weight, 525 grm.

Daily loss of protein, 69·5 grm., representing about $5 \times 69{\cdot}5 = 347$ grm. of "flesh."

Daily loss of fat, 139·6 grm.

Daily loss of glycogen, 23 grm.

Daily loss of energy, 1,696 Calories (measured by calorimeter).

Calculated in the usual way the energy loss was $139{\cdot}6 \times 9{\cdot}3 = 1{,}298$ Calories from fat, $69{\cdot}5 \times 4{\cdot}1 = 285$ Calories from protein, and $23 \times 4{\cdot}1 = 94$ Calories from glycogen, the loss of glycogen being mainly in the first two days. About 77 per cent of the energy was thus obtained from the oxidation of fat; on the other hand nearly 70 per cent of the loss of weight was due to loss of "flesh" and therefore over 50 per cent to loss of water. If we assume that the 234 grm. which the men of the North Lancashires were losing daily were similarly composed we reach the conclusion that their daily deficit of energy was $\frac{234}{525} \times 1{,}696 = 756$ Calories. This agrees fairly well with the deficit estimated in the Table in Appendix V from other data. They were thus probably losing about 62 grm. of fat and 170 grm. of flesh daily during the last five days of the experiment.

(38) The officers were losing weight half as fast again as the men and their rate of loss approached more nearly that of the subject of the starvation experiment, who was of course doing no work, although he was absolutely without food, while the officers were consuming during the second week the whole of the ration supplied to them.

(39) Some insight into the loss of weight is afforded by the measurements of chest, abdomen and calf. During the first week the measurements showed an average diminution of 0·56 in. round the chest and a

gain of 0·22 in. round the calf. In the second week there was a further average loss of 0·42 in. round the chest, with a diminution of 0·16 in. round the calf. These results, on which, however, not too much stress can be laid without further confirmation, suggest that the muscles of the legs, which was most used, had on the whole gained at the expense of other parts which were less used. Curiously enough, the average measurements round the abdomen only showed a loss of 0·47 in. over the whole period as compared with 0·9 in. round the chest.

(40) It has already been pointed out that both the absolute and percentage loss of weight was, on the whole, greatest in the heaviest men. This is exactly what might be expected on physiological grounds. The heavier a man is, the more work he has to do in marching, &c., and the more heat he has to produce in order to maintain the body temperature during rest. The increased energy requirements probably increase about in proportion to the increase of body surface, i.e., to the square of the cube root of the body weight. The heavier men of a Guards' Regiment probably require about a sixth more food than other soldiers. In this connexion it is interesting to note that in the late war in Manchuria the Japanese allowed double rations to be issued to those men of their army who happened to be over 6 ft. in height.

(41) We have now passed in review:—

(1) The composition and nature of the rations supplied, and their energy value;
(2) The amount and nature of the work done, and
(3) The effect produced by the work of the march on the men taking part in it as evidenced by the change in their weights and the alteration of certain body measurements.

We are therefore in a position to estimate the relative value of the food and the work in the light of the ultimate effect of the work on the men's bodies. The salient facts arrived at are these. In the first place, taking the whole period of the experiment the men lost weight, and the measurements of their chests and abdomens and to less extent of their calves showed distinct tissue waste. It would appear, therefore, that a certain call was made on the bodily reserves to furnish the energy required for the march. In the second place the ration was deficient in energy value not only on theoretical grounds, but as a matter of actual experience, as shown by the feelings of the officers and men taking part in it; this deficiency being particularly noticeable in the low proportion of fat present. Judging by the feelings of the men there seems to have been some lack in the direction of carbohydrates, but this was less felt by the officers. On purely theoretical and also on practical grounds the ration is therefore seen to be defective in amount. Lastly, the work was not excessive. In Appendix V a Table is given showing the daily balance of food and work, from which it will be seen that taking the whole period of 288 hours that elapsed between the first weighing at 9 a.m. on October

1, and the last weighing at 9 a.m. on the 23rd, there was an average daily deficiency of 890 Calories of energy received as against the energy actually expended.

(42) The figures in this table corroborate therefore the deductions made from the other facts ascertained, and the only conclusion that can be drawn fairly is that the average ration as laid down in Allowance Regulations, paragraph 27, does not furnish sufficient energy for the performance of an amount of work a great deal less than that which the soldier must ordinarily be expected to perform on active service, and further that this deficiency is about 1,000 Calories. The Committee are of opinion that the ration should be such as to supply not only sufficient energy for the performance of work that may be graded as hard, that is equivalent to 4,500 Calories as a minimum, but should also furnish a reserve to meet any sudden calls on the soldier's energy. There is no doubt that the better men are fed the better they will be able to work; given plenty of exercise there need be no fear of over-feeding; on the other hand, there is no more insidious cause of inefficiency and disease than persistent underfeeding, while there is no necessity to point out the effects on discipline of a ration which must tempt men to supplement their supplies by looting.

(43) The following suggestions are put forward with a view to meeting this position. It is recognized that as far as possible the weight of the ration should not be interfered with. This amounts at present to 1,332·5 grm. if tinned meat and biscuit are issued, and to 1,559 grm. when fresh meat and bread are supplied. These figures are equivalent to roughly 3 lb. and 3½ lb. respectively. For practical purposes 3 lb., the weight of the corned beef and biscuit ration, may be taken as the weight of the ration for transport purposes.

(44) It is obviously impossible to interfere with the meat ration. For trade purposes it is necessary to retain the 1-lb. tin, and the disadvantages of issuing one tin between two men are so obvious that even if it were theoretically advisable to reduce the meat ration (which it is not) the present allowance would have to be retained.

(45) Similarly as regards the biscuits. These are a good ration and liked by the men, and their energy value per gramme weight is extremely high, about 3·83 Calories. If then we deduct the meat and the biscuits this leaves us with the potatoes, jam, sugar, tea and salt. The tea and salt cannot be interfered with. The sugar and jam certainly cannot be lessened and are besides extremely valuable sources of energy.

(46) The corollary is that the potato ration is the only one that can be altered satisfactorily. The potato ration possesses the least energy value of any of the constituents of the field service ration, that is only 0·68 Calorie per gramme. It is bulky and does not bear transport well. The problem is to substitute for the 8 oz. potatoes some other foodstuffs which will supply not only the 154 Calories that these supply, but an additional

1,000 Calories as well, within the limits of the same weight. This demands an energy value of just over 5 Calories per gramme. Obviously these foodstuffs must be of a fatty nature, which ingredient, as a fact, is decidedly wanting in the present ration. The two foodstuffs that immediately suggest themselves are bacon and cheese. The energy value of bacon is 6·4 C. per gramme (Atwater Bulletin No. 28, revised edition, p. 42, "Bacon smoked, all analyses, edible portion"); 6 oz. would furnish therefore 1,098 Calories. There still remain 60 Calories to be supplied, and these could be furnished by doubling the jam ration, as already suggested. If one tin were allowed amongst two men instead of amongst four this would supply 285 Calories extra, an allowance sufficient to account for any waste due to non-absorption.

If this were objected to as somewhat raising the total weight of the ration, 2 oz. of cheese supplying: Dutch cheese, 180 Calories; Cheddar, 268 Calories, or Cheshire, 228 Calories, could be given instead.

(47) It may be objected to the above that vegetables are excluded from the ration. This is true, but it must be remembered that, as a matter of fact, when troops are on the move vegetables are either not available or, if available, are issued in a form which reduces their antiscorbutic value. Except from their bulk they possess no dietetic value in this case, and bulk alone is precluded by the conditions of the problem.

(48) The ration thus sketched out provides just sufficient energy for the performance of an amount of work equivalent to that performed on this experimental march. It is obvious, not only from the theoretical estimate of the amount of that work, but also, and equally, from a perusal of the diary of the march, that the work so done was by no means equivalent to the probable demands of active service. It follows that this ration does not fulfil the requirements; much less does it furnish a reserve to meet exceptional circumstances of exposure or exertion. In addition the ration possesses to a marked extent the defect of over-concentration. This is, however, unavoidable if the weight of the ration is to be maintained at its present figure. It is impossible to furnish 4,000 Calories in a ration weighing only 3 lb. without this concentration; it is, therefore, impossible to increase the energy supply inside the limits of that weight.

(49) Under these circumstances the Committee are definitely of the opinion that the whole question of the weight of the ration must be considered. They are not aware of the reasons which led to the present weight being fixed upon, but it does not appear that it was arrived at as the result of any accurate observations of the amount of energy demanded by the exigencies of active service, or of the amount that could be furnished by the various foodstuffs. The Committee are well aware of the gravity of a proposal that must affect seriously all questions of supply and transport, and would not put such a proposal forward were it not that an insufficient supply of food is undoubtedly a very fruitful cause of disease in war. There is no doubt whatever that a man's chances of resisting the

attacks of epidemic disease, especially of those diseases which effect an entry into the system by means of the alimentary tract, depend more on his being well fed than on any other one condition. Whether it may be necessary to increase the total weight carried by the Army or not, or whether the increased ration may be made room for by a readjustment of the present articles carried, is naturally not within the purview of the Committee. They would now desire, however, to point out, and with the greatest emphasis, that if any such readjustment has to be carried out the only item of supply that can be placed before food is ammunition. All other articles, clothes, medicines, even hospital accommodation, should give way to this imperative need.

(50) The total amount of energy which the Committee are of opinion should be furnished under ordinary conditions of active service is 4,500 Calories, and there should be a certain elasticity about the scale, permitting of an increase up to 5,000 Calories. They are of opinion that this cannot be furnished without undue concentration under a weight of 3¾ to 4 lb. At this weight sufficient bulk can be provided to make the ration a satisfactory one, even if 5,000 Calories are estimated for. On the question of weight and elasticity it may be noted that the French "*ration forte*" weighs 3½ lb. normally, and can be increased by the addition of meat and bread to over 4 lb., or even 5¼ lb., by increasing all its constituent articles 50 per cent. The German special field ration (*ausserordentliche Kreigsviktual portion*) weighs, with the normal vegetable issue of peas, beans, or lentils, over 4 lb., whilst if potatoes are included the load rises to over 7¾ lb. It may be objected that the French or Germans do not anticipate having to actually transport these weights, since their military operations are expected to take place in countries where local supplies are plentiful. On the other hand, it may be urged that the British soldier fights under conditions where he is less able to supplement, by purchase or otherwise, any deficiency that may exist in the ration as supplied to him by the State.

Taking the present ration as weighing 3 lb. with the potato ration, it is suggested that this latter be omitted. This reduces the ration to 2½ lb., with an energy value equivalent to 3,157 Calories. The additional energy to be supplied is therefore 4,500 Calories — 3,157 Calories = 1,400 Calories approximately. It is proposed to meet this in the following manner :—

Two ounces (actual) bacon, 333 Calories.

Two ounces cheese (Chedder or Cheshire), 240 Calories.

Four ounces jam (nominal weight), 284 Calories.

(This jam is additional to the present issue, and the effect would be that one tin would be supplied to two men for one day instead of four men.)

Two ounces dried peas, beans, or lentils, or 2 oz. oatmeal, 200 Calories.

Three ounces coffee, milk and sugar, 300 Calories.

(This coffee ration is contained in a block lately submitted for examination by "The McDoddie Viands" Company, the reasons for its inclusion are stated later.)

The above additions furnish a supply of 1,357 Calories (after deduction of 10 per cent) at a weight of 1 lb. 2 oz., making the total ration equivalent to 4,600 Calories at a weight of 3 lb. 10 oz. To increase this to 5,000 Calories it would only be necessary to double the bacon issue, the total weight then would be 3 lb. 14 oz., and the energy value 5,200 Calories. The suggested rations give a fair margin of energy over the standards selected, at the same time keeping well within the weights proposed. The margin would, however, be probably absorbed by the fact that the bacon and cheese would be nominal weights.

The reason for the inclusion of the coffee, milk and sugar blocks is that it is felt very necessary to supply with the ration some issue that will provide an easily prepared hot drink, with not only a stimulant but also a nutritive value. The blocks suggested were tried by Lieutenant-Colonel Melville and Major Beveridge on the experimental march, and found most satisfactory. They can furnish at the weights given 1½ pints of extremely palatable coffee, and no preparation beyond breaking up in the fingers and boiling is necessary; about ten minutes is sufficient for this and no utensil beyond a mess-tin is required.

A further issue of pickles or other condiments is also advised, either daily or two or three times a week. The weight of this issue should be 1½ or 2 oz. It would have a very distinct antiscorbutic value, and would in addition help to do away with the deadly monotony of the ordinary ration.

The Committee suggest that an experiment with such a ration should be made on the same lines as those of the march which is the subject of this report.

SUMMARY OF VALUE OF RATIONS OF DIFFERENT COUNTRIES IN CALORIES.

Ration	France	Germany	United States of America	Japan	Russia
Peace ration	3,426	3,161*	4,179*	..	4,060*
Manœuvre ration	3,164	3,480*	..	..	..
Travel ration	..	..	2,735	..	..
War rations—					
Normal	3,064	2,801*	4,199	4,343*	4,891*
Augmented (without soup bread)	3,686	..	..	..	..
Augmented (with soup bread)	4,005	..	..	..	..
Emergency	2,130†	2,766*	4,110	..	..
Filipino	..	..	4,007*	..	..

* Dr. Pembrey's calculation.

† Or 2,515 with pea-soup.

(*To be continued.*)

Reviews.

CLINICAL ATLAS OF SECTIONAL AND TOPOGRAPHICAL ANATOMY. By R. J. A. Berry, M.D., F.R.C.S.Edin. William Green and Sons. Pp. 13. 60 coloured illustrations. 1911. Price £2 2s.

In most modern dissecting rooms material is so scanty that the claims of sectional anatomy have to yield to those of dissectional. Professor Berry is fortunate in having an excess of material, which enables him to produce the sixty plates of the present volume. The bodies are first hardened by injections of formaldehyde, and then frozen before cutting. The sections are made with an electrically driven saw with twenty-four teeth to the inch. The reproduction of the sections is made by photographic processes, thus avoiding the possibilities of error or idealization in tracings, drawings, or engraved plates. And lastly, the sections, at any rate as far as the trunk is concerned, are made with reference to Addison's clinical planes, so that the situation of any organ appearing in a section can be accurately reproduced on the surface of the body, centimetre scales being furnished at the sides of the sections to measure distances. This power of correctly localizing structures seems to us the most valuable feature of Professor Berry's work, but we think that in order to get the full benefit of it, the size of the plates should have been materially increased. In the case of the vertical sagittal sections especially, photographic reduction has been carried to a point which renders the identification of structure sometimes almost impossible. Besides transverse and sagittal sections of the trunk there are transverse sections of the head and neck, and topographical dissections of the thorax and abdomen, and of the dorsal aspect of the trunk. As examples of a department of anatomy which has been somewhat neglected Professor Berry's work deserves the careful study of the anatomist and the surgeon. The more carefully these plates are examined the more one must admire the patient assiduity and artistic capacity shown in their preparation.

E. M. P.

YELLOW FEVER. Results of the work of Major Walter Reed, Medical Corps, United States Army and the Yellow Fever Commission. Washington Government Printing Office.

This is a compilation of the various papers published in connection with the Yellow Fever Commission in Cuba, and includes, besides reprints of papers published by the various members of the Commission, a narrative record of their methods and short memoirs of those who took part in what was one of the most courageous things that has ever been done in connexion with scientific research. The astonishing thing is that the book which would seem, in part at any rate, to be intended as a memorial of one of the greatest benefactors of Tropical America and one of the greatest heroes that America has produced, should be turned out on cheap paper and with flimsy paper backs. The ways of Government are indeed strange! Apart from its use as a record of a brave band, the volume serves as an excellent model of how such researches as those of Reed, Carroll, Lazear, and Agramonte should be conducted, and it gives at first hand the details of their experiments, which are otherwise scattered through a host of publications difficult to get at.

W. S. H.

YELLOW FEVER BUREAU BULLETIN, No. 1, May, 1911. Liverpool University Press. Price 1s. net.

This monthly publication represents one of the latest activities of that extremely energetic institution, the Liverpool School of Tropical Medicine, and like similar publications, the *Bulletin of the Sleeping Sickness Bureau* for example, aims at collecting all the information on the subject of yellow fever for the benefit of workers in that subject, and of practitioners in countries where yellow fever exists. Such organizations cannot but prove of the greatest possible value in the elucidation of the numerous problems involved and in the fight against the disease in question.

W. S. H.

TWENTY-SIXTH ANNUAL REPORT OF THE BUREAU OF ANIMAL INDUSTRY (FOR THE YEAR 1909). Washington: Government Printing Office, 1911, 9 by 6 inches. 406 pp. Price not stated.

On taking up this report one is at once struck by the enormous variety and importance of the work which is being carried out by this branch of the United States Department of Agriculture. It deals with all branches of animal industry, in so far as Inter-State and Federal matters are concerned, both from the public health, human and animal, and from the commercial points of view. As, however, the internal government of each State is controlled by its own legislature there are separate State departments, and the Bureau of which this is the report deals almost entirely with matters which concern more than one State, the exception being that the individual States may ask for its assistance in dealing with some special problem. Food for other than local consumption, and the transport of animals which may have been exposed to infection are, perhaps, the most important of its public health duties. Altogether, the Bureau employs 3,268 persons, 2,499 of these being for meat inspection, including 800 veterinarians. The Bureau is divided into eight main divisions, viz.: Animal husbandry, biochemical, dairy, inspection, pathological, quarantine, zoological, and experimental. In addition there are the Chief and Assistant Chief of the Bureau and an editorial department. Many of the employees are transferred from one division to another as may be desirable as it often happens that the same men may most usefully be employed in field work in the summer and in meat inspection in the winter.

The report deals with a variety of subjects, including a description of an outbreak of foot-and-mouth disease in Pennsylvania and neighbouring States, which was satisfactorily traced to its source and eradicated; the work done in exterminating the ticks which spread Texas fever amongst the cattle in the southern states; tuberculosis as affecting live stock; veterinary education in the United States; the dairy industry; meat inspection; anthrax, rabies and other diseases of animals.

These are only a few of the subjects on which there are valuable articles of extreme interest. Space will not permit of any detailed account of these articles here, but a précis of some of the more important will be included in subsequent numbers.

C. H. S.

THE BRITISH SANATORIA ANNUAL. London: John Bale, Sons and Danielsson, Limited, 1911. With numerous illustrations. Price 3s. 6d. net.

This work is a handbook giving a complete list with all necessary details concerning the various sanatoria and convalescent institutions which have been established in the United Kingdom.

It is divided into three sections: (1) Private sanatoria; (2) sanatoria that are free, or that take patients at reduced rates, or on special terms or conditions; (3) homes and convalescent institutions.

The information given in most instances includes the class of patients that are admitted; the stage of the disease dealt with; the position and altitude of the buildings together with the soil on which they are erected; the climate of the district; the description with photographs of the buildings; the charges made; the easiest methods by which the institutions can be reached by rail, and many other useful particulars.

The number of sanatoria referred to is very large, and among them are found full descriptions of King Edward VII. Sanatorium at Midhurst; the Brompton Hospital Sanatorium at Frimley; the Mount Vernon Hospital at Hampstead; the National Sanatorium for Consumption at Bournemouth; the Royal National Hospital for Consumption at Ventnor; Lord Mayor Treloar's Cripples' Home at Alton, &c.

To those who still believe in the efficacy of sanatorium methods for the cure of consumption this would be a useful handbook. Also, those who wish to find a suitable establishment for their consumptive patients, where these patients could reside under the most favourable conditions, would find in this book many useful details from which they would be able to make a selection.

F. H. T.

A HANDBOOK OF THE TSETSE-FLIES (GENUS GLOSSINA). By Ernest Edward Austen, Assistant in the Department of Zoology, British Museum (Natural History). London: Printed by order of the Trustees of the British Museum. Pp. x and 110. Ten coloured plates. Price 5s. 6d. net.

Since 1895, when it was discovered that *Glossina morsitans* was the carrier of the parasite causing Nagana, or the Tsetse-fly disease of domestic animals, the study of this genus of flies has become more and more important. It may truly be said that the material progress of many parts of Africa depends upon our knowledge of, and our power of coping with, these insect pests. *G. palpalis*, the tsetse-fly of sleeping sickness, threatens to interfere with the supply of native labour to the Transvaal gold mines, and in many districts the labour supply is already seriously interrupted by the same cause.

A map is given showing the distribution of glossina, and from it can be seen that the greater part of the African Continent is occupied by these flies.

The study of tsetse-flies was much aided and advanced by the publication of Mr. Austen's "Monograph of the Tsetse-flies," in 1903, and this Handbook is designed to bring the subject up-to-date.

Fifteen years ago, in the popular mind, there was only one species of tsetse-fly, the *G. morsitans;* and one disease "the fly disease." Now Mr. Austen describes ten species of glossina, and the fly diseases affecting man and the domestic animals, which have been investigated, are quite as numerous.

Excellent coloured plates of these ten species, and many illustrations in the text, are given from drawings by Mr. Engel Terzi.

The handbook contains, besides the description of the various species, an account of the distribution and bionomics of the flies.

In conclusion, this book should prove invaluable to Colonial surgeons and veterinary officers, who are at present fighting the various trypanosome scourges, which owe their dissemination to the tsetse-flies.

D. B.

Current Literature.

Blackwater Fever.—Deeks and James, in a "Report on Hæmoglobinuric fever in the Canal Zone," published by the Isthmian Canal Commission, give the results of their investigations in 230 cases of blackwater fever. In all cases there was a history of malaria and in many the malarial attack immediately preceded the hæmoglobinuria; on the other hand cases arose in which the malaria had run its course before blackwater fever appeared. There were 102 cases in which blackwater occurred in patients already in hospital, and in ninety-eight of these the patients had been admitted to hospital for malaria which was diagnosed either clinically or by the microscope; the four remaining cases were admitted for surgical affections, but all of them either had malaria at the time or had a history of recent attacks. Of the patients admitted to hospital during the period dealt with there were 40,928 cases of malaria and 42,000 admissions for other diseases; there was no instance of blackwater fever occurring among the latter. Malaria and blackwater fever followed the same epidemiological course; they were both comparatively rare among the Americans employed and among the negroes, in the case of the former because of the sanitary precautions taken, in the latter because of racial immunity; on the other hand, among the European employees (Spanish and Italian labourers, for the most part) who neglected sanitary precautions and who had no racial immunity, both blackwater fever and malaria were common. The majority of cases of blackwater fever occurred after the first year of residence. The parasites found before the onset of blackwater were in the majority of cases malignant tertian, but in a few cases benign tertian parasites were present; this, however, in such a small proportion that it is possible that they were cases of mixed infection. With regard to the action of quinine, the authors give records of cases in which quinine was an undoubted exciting cause of an attack of hæmoglobinuria; on the other hand they found cases in which no quinine whatever had been given, and others in which quinine appeared to cause blackwater at one time and in which it was given with impunity at other times. Among the clinical descriptions the authors refer to the numerous varieties of the disease; in some cases one may get a short bout of fever lasting twenty-four hours while the hæmoglobinuria persists for two or three weeks; or again, it may be the fever that persists after the cessation of hæmoglobinuria. With regard to treatment, quinine was given if parasites were found; as a rule it was not necessary. If the quinine was followed by a recurrence of the hæmoglobinuria it was stopped for a few days and then resumed, since it was found that many patients were able to take quinine at one time but not at another.

The authors draw special attention to the part which syphilis plays as an aggravating factor in malaria; occasionally the combination gave rise to a clinical and blood picture closely resembling liver abscess.

Their conclusions are that malaria is a necessary precedent of blackwater fever, that this latter only occurs in regions of intense malaria (with an endemic index of roughly 80 per cent) and that quinine may at times act as an exciting cause of an attack but is not a necessary precedent.

W. S. H.

Anti-rabic Vaccine.—Semple (in No. 44 of the "Scientific Memoirs of the Officers of the Medical and Sanitary Departments of the Government of India") describes the results of attempts to produce a safe anti-rabic vaccine. An exposure of rabies virus to a temperature of 50° C. for fifteen minutes or to 1 per cent. carbolic acid at 37° C. for twenty-four hours was sufficient to destroy its *rabicidal* properties; at room temperature a 1 per cent solution of carbolic acid would not kill the virus in less than six days. Monkeys, dogs and rabbits were injected with the carbolic acid-killed vaccine which was previously diluted with an equal quantity of normal saline to reduce the strength of carbolic acid to ½ per cent and of the rabies virus to 4 per cent. They were subsequently tested by intra-dural inoculation of virus; in the case of the two monkeys they proved to be immunized; the same was the case with one of the two dogs and one of the two rabbits. The other dog and rabbit died of rabies with, however, a longer period of incubation than the control; the total amount of "vaccine" given was 36 cc. in the case of the rabbits, 100 cc. in the case of the successful dog experiment, and 60 cc. in the case of the monkeys, this being given in daily doses for twenty-four to twenty-eight days. The serum of the immunized animals showed definite *rabicidal* properties.

W. S. H.

The Digestibility of Cheese.—(C. F. Deane, U.S. Department of Agriculture, Bureau of Animal Industry. Circular 166). The paper consists of a study of the food value of several varieties of cheese, with an account of a series of experiments carried out with human subjects.

Artificial digestive experiments were also used and found to simply corroborate the results of the experiments on the human subject. The author has conclusively disproved the popular idea, that cheese, especially when green or unripened, is difficult to digest or causes constipation. The perfectly green curd was evidently as digestible and, so far as its nutritive value was concerned, was as good a food as the same cheese at any stage of ripening. Cheese made from skimmed milk, which should only be sold as such, possesses considerable nutritive qualities and could be consumed by the labouring classes at a pronounced saving. The supposed condimental value of cheese when in small quantities as a stimulus to the digestion of other foods, was not demonstrated in these experiments, or in other words, the adage that "cheese digests all things but itself" has no foundation whatever in fact.

The author we are glad to find remarks: perhaps the most valuable result has been in showing clearly the great value as a food of all the more common varieties of cheese. This fact is not quite new to us in Great Britain, and has lately been fully taken advantage of in our Army.

In England it has long been a staple article of diet of great value, especially among the miners of the North. Its easy portability and high nitrogen value make it an ideal food in many conditions of travel and arduous work.

An interesting fact is given which we have not seen remarked elsewhere, that people who like a highly flavoured cheese never become tired of it. No kind of meat, excepting dried beef, carries such a large percentage of protein as cheese, and as dried beef contains a much greater percentage of water, the other food constituents apart from the protein are much less than is found in cheese. This is a fact which is frequently lost sight of but of considerable importance. Fresh beef as purchased has, weight for weight, little more than half the food value of cheese in either protein or fat, and the same is true of practically all other fresh meats, which have in many cases such a large percentage of refuse and in all cases such a large percentage of water that they are noticeably inferior to cheese in food value. Bacon and fat pork are exceptions, but their food value is mostly in the fat, which can be and is replaced to a great extent by the carbohydrates of vegetables at a much less cost.

A pound of cheese has nearly the same food value as two pounds of any fresh meat, as food. It is worth as much as, or more, than a pound of ham and is more digestible, and it is equal to two pounds of eggs, or three pounds of fish. In price (U.S.A.) good cheese costs about a third more than steak and twice as much as the cheaper boiling beef, while it costs practically the same per pound as smoked ham or bacon. The author finds that cheese can be eaten in large quantities without danger to health and considers that the public would do well to turn its attention a little more toward cheese, since greater quantities can be used at a saving to the consumer.

The circulars issued by the United States Department of Agriculture are well known for their high scientific value. The present one goes a long way to advance our knowledge of a very important article of diet, and altogether is a most interesting contribution. W. W. O. B.

Appendicitis.—Kummell (*Münch. med. Woch.*, April 11, 1911, p. 822) gives the statistics of 3,124 operations for appendicitis. The mortality was 6·5 per cent. That of interval-operations was nil. That of 511 acute cases within fifty hours of onset was 1 7 per cent.

Fromme (*Münch. med. Woch.*, April 11, 1911, p. 807) states that the mortality of 647 cases of appendicitis treated during the last fourteen years was 9 per cent. The fatality of seventy-six early-stage operations was 11·8 per cent, that of intermediate-stage operations 7·7 per cent and that of late stage 13·3 per cent. Seventy-eight per cent of forty-one patients with general peritonitis died. The mortality of 378 interval-operations was under 1 per cent. Out of sixty-eight individuals who were treated expectantly, twenty-seven recovered permanently. Twenty-nine suffered from relapses or chronic troubles. C. B.

Typhus Fever.—Nicolle (*Ann. Inst. Past.*, January, 1911) finds that typhus fever can be induced in monkeys by injecting into their abdominal cavities 4 or 5 cc. of blood withdrawn from a patient suffering from this disease. The incubation period is from two to three weeks. The infection can be transmitted from animal to animal without loss of virulence. A severe attack protects, but abortive seizures fail to do so. The serum of both convalescent men and apes acquires preventive and curative properties from the tenth day of convalescence. The virus is destroyed by heating to 58° C. for fifteen minutes. It is unable to pass through a porcelain filter. He showed in the year 1909 that the *Pediculus vestimenti* can convey the infection. The poison undergoes elaboration in the body of the louse, as in the case of the stegomyia and phlebotomus, for they are not infective until five to seven days after sucking the blood of a typhus patient. Ricketts and Wilder have observed hereditary transmission of the virus in *P. vestimenti.* In typhus fever the blood is virulent in the incubation stage, throughout the pyrexia, and during the first two days of convalescence. In children the ailment is frequently so short and benign that it escapes recognition. The typhus fever of Mexico has been similarly investigated by Anderson and Goldverger, McCampbell, and by Ricketts and Wilder, who have confirmed Nicolle's experimental results. Ricketts himself fell a victim to the malady in May, 1910.

Dreyer (*Arch. f. Schiffs u. Tropen. Hyg.*, 1911, p. 319) reports the occurrence of this fever in Egypt. He inoculated successfully seven apes and ascertained that the infecting agent was retained by a Berkefeld filter. This observer found the typhus fever blood does not agglutinate the *Micrococcus melitensis* which has been said to occur. C. B.

The Invisible Virus of Scarlet Fever—J. Cantacuzéne (*Comptes-rendus Soc. Biol.*, lxx, 403) reduced the resistance of the monkeys, *Cercopithecus cephus*, *C. griseo-viridis*, *Macacus rhesus* and *M. sinicus*, by means of hypodermic injections of 10 cc. of a 10 per cent sodium chloride solution. He then inoculated one with 10 cc. of blood withdrawn from a scarlet fever patient at the beginning of the eruption, another with 2 cc., another with 15 cc. of pericardial fluid, another with an emulsion of the bronchial glands. After incubation periods of five, thirty-seven, nine and twelve days, scarlet fever lasting about three days occurred. Glandular enlargement and the characteristic rash followed by desquamation were marked. Intravenous injection has failed to convey the disease.

Bernhardt (*Deutsch. med. Woch.*, April 27, 1911) has inoculated emulsions of the scrapings of scarlet fever tongues beneath the skin of *Cercopithecus griseus*, *C. fuliginosus*, *Macacus rhesus*, and *M. cynomolgus*. Fever with glandular enlargements ensued. On the third day he excised a gland which might have contained streptococci, emulsified it and injected it into another animal. On the third passage a gland may be obtained which no longer contains bacteria. Inoculations of this have induced scarlet fever followed by desquamation after an incubation period of four days. He has succeeded in passing the scarlet fever from ape to ape three times. The contagium can pass through a Berkefeld candle: two positive results in four experiments, incubation periods four and seven days respectively. The streptococci gave rise to no pathogenic effects. Bernhardt has also induced the disease by rubbing the buccal mucous membrane of a monkey with the scrapings of a scarlet fever tongue. Incubation period eighteen days.

Landsteiner, Levaditi, and Prasek (*Comptes-rendus Soc. Biol.*, April 29, 1911) have painted the throat of a chimpanzee with the tonsillar secretion of scarlet fever cases. In two days tonsillitis came on. Seventy-five cc. of scarlet fever defibrinated blood was injected hypodermically five days after the first inoculation. After two days scarlet fever appeared which caused the death of the animal nine days later. The microscopical lesions of the skin and kidneys resembled those found in the human infection. In a second experiment a febrile tonsillitis was set up but no eruption was observed. The authors failed to cause pathogenic changes with cultures of streptococci isolated from scarlet fever.

C. B.

Intravenous Narcosis.—Burkhard (*Münch. med. Woch.*, April 11, 1911, p. 778) has tried the effects of injecting into the veins of animals solutions of urethan, hedonal, chloralhydrate, chloralamid, veronal and isopral. He has extended his observations to man, and has induced narcosis by intravenous injections in 250 patients. Isopral, which belongs to the chloral group and is trichlorisopropyl alcohol, has given good results; 100 to 200 cc. of a 1·5 per cent solution in physiological saline fluid are introduced into a vein at the rate of 40 cc. per minute. This may be followed by the intravenous administration of a 5 per cent mixture of ether and saline solution. He has used this combined method in seventy cases, and thinks highly of it for patients suffering from exhaustion, collapse, loss of blood, cachexia, peritonitis, or embarrassed breathing, also in operations about the head, neck, mouth or throat.

Degeneration of the heart, impeded circulation, advanced arteriosclerosis, nephritis, jaundice and plethora are contra-indications.

C. B.

The Effect of the Sun in the Tropics on Animals and Man. Hans Aron, Professor of Physiology in the University of Manilla (*Berlin klin. Woch.*, June 19, 1911). The rays emitted by the sun may be divided into three groups: (*a*) The ultra-red or heat rays; (*b*) the visible or light rays; (*c*) the ultra-violet or actinic rays. Freer, Bacon, and Gibbs have investigated the solar spectrum in Manilla, and find that its range on the ultra-violet side is not greater than in northern regions, but its chemical activity in July as gauged by its action on oxalic acid and uranyl nitrate is from five to twenty times greater than in Chicago.

Many observers have ascribed the peculiar effects of the tropical sun to the action of the actinic and light rays on the human body. The negative results of the experiments on the American troops in Manilla with orange-red coloured clothing as well as numerous observations made in the Tropics by Aron have convinced him that the actinic theory cannot be maintained.

In order to determine the effect of the sun's heat rays in Manilla Aron made a number of experiments, some of which are quoted below.

One thermometer was placed in the rectum of a dead dog, and another under its skin, and the body suspended in the sun. The thermometer placed under the skin very soon registered a temperature of 46° C., while the one in the rectum showed a gradual rise due to absorption of heat. A living body absorbs heat in the same way, but a rise in the body temperature is prevented by the physiological mechanism for increasing the loss of heat.

A dog kept exposed to tropical sunshine soon suffers from acute discomfort, and its rectal temperature is found to rise from 38° C. to 39° C.; a thermometer placed under its skin, however, shows a rise to 40° C. or higher. Rabbits placed under similar conditions show a greater rise of temperature, the thermometer placed under the skin recording as much as 46° C., but when these temperatures are reached the animals soon die.

The most instructive experiments were those conducted on monkeys (*Macacus philip.*, Geoff.). When a strong and healthy monkey is placed so that it is continuously exposed to the sunshine its temperature rapidly rises, and seventy to eighty minutes' exposure, even between 8 and 9 a.m. in December or January, is sufficient to kill it. If protected from the direct rays of the sun it can be kept in the same place for any length of time without suffering any injury.

Normally the rectal temperature of the monkey is 0·5° to 1° C. higher than its subcutaneous temperature. When exposed to the sun's rays the body temperature rapidly rises, but the subcutaneous temperature is always 1° to 2° C. above that of the rectum. The immediate effect of shaving a monkey is to reduce its temperature generally, but the effect is more marked on the subcutaneous temperature. When shaved monkeys were exposed to direct rays of the sun, the rise in temperature and subsequent death took place more rapidly than in similar animals whose hair had not been removed.

That the animals exposed to the sun's rays died as a direct result of hyperpyrexia is shown by the following experiments. Monkeys were exposed to the sun's rays as in the previous experiments, but by means of fans a strong current of air was directed on to the animal's body. In spite of several hours' exposure under these conditions the rise in body temperature was only slight, and the animals remained healthy. A control animal exposed within a few yards of the first one, but not artificially cooled, died of hyperpyrexia in fifty-eight minutes.

In another experiment the body of a monkey was placed in a wooden box with perforated walls, which was again placed inside a larger one, leaving an air space between the two, so that its head was exposed to the sun's rays, but its body was thoroughly protected by the ventilated air space and walls of the boxes. The monkey was kept in this position and exposed to the sun's rays from early morning till night without any rise of body temperature taking place, or any signs of interference with its health. The same animal was exposed under similar conditions to direct sun's rays for altogether fifty-four hours within a period of twelve days, and apparently suffered no damage. During this period temperatures taken in the hair on the animal's head were frequently found to register as high as 47° C.

Some observations were then made as to the effect of sun's rays on the human skin. White and dark brown skins were selected and their normal temperature carefully determined; this varied between 32·5° C. and 33·5° C. There was no constant difference between the two colours. When exposed to the sun the skin temperatures rapidly rose to 36·5° C. or 37° C.; on continuing the exposure there was no further rise of temperature, but on the contrary a gradual fall of 0·5° C. to 1° C. was observed. The fall usually began with the appearance of diaphoresis. The fall was more rapid and greater when active exercise was being taken, and there was copious perspiration. If the man had been working hard and perspiring freely before being exposed to the sun's rays there was only a slight rise of the skin temperature. Dark skins did not, so far as the experiment went, show quite so much rise of temperature as white ones. A possible explanation may be that the dark skin absorbs more heat rays at first, but in consequence the sweat glands come into action sooner, and so prevent the temperature from rising as high as in the case of white skins.

Although the effect of the sun's heat rays on the human body is neutralized by physiological action this makes certain demands on the human organism. This is shown by one set of observations, in which persons lightly clad were kept at rest but exposed to the sun's rays; the result of this exposure was to increase the pulse rate by 8 to 12 beats, and the volume of respiration by 23 per cent. Under similar conditions a Philippino weighing 57 kg. lost weight to the extent of 280 grm. in one hour, although no allowance was made for the perspiration absorbed by his clothes.

When active exercise is being taken the heat produced by muscular action added to that absorbed from the sun's rays may produce a condition of collapse. C. E. P.

Anti-typhoid Vaccination in United States Army (Extract from the *Army and Navy Journal*, April 15, 1911).—"In brief, the method used in our army consists in making three subcutaneous injections at ten-day intervals of a killed culture of *Bacillus typhosus*. The vaccine is prepared in the laboratory of the Army Medical School at Washington, D.C., and is sent out in 1 cc., 5 cc. and 10 cc. sealed ampoules, the standard content being 1,000,000,000 dead bacilli per cubic centimetre. The first dose is 0·5 cc. and the second and third doses 1 cc. each.

"The vaccination of an entire brigade would appear at first sight to be a rather stupendous task, and, as hypodermics are usually given, would indeed be such; but the army method, which is the result of facing just such a proposition, has made possible the administration of over 4,000 doses without a single infected arm and with two officers working, at the rate of five doses per minute, assisted by four men and one non-commissioned officer.

* * * * *

"Records of each case are kept on cards furnished by the Surgeon-General's Office, and for this purpose a serjeant is stationed at a desk just within the door by which the men enter the vaccination room. Coat racks are provided in the hall. The men enter by organizations in as nearly alphabetical order as possible, each with his left arm bare, exposing the lower two-thirds of the arm. The necessary data are given to the serjeant as each man enters the 'scrub-up' line. Here at the first table the arm is scrubbed with green soap and warm water, rinsed, and the subject passes on to the second table, where a second man washes the previously scrubbed area with a 1 to 1,000 solution of mercuric chloride; he then advances to a third table, where the field is rubbed with 95 per cent alcohol, after which he comes to the officer who is to vaccinate him.

"The use of trikresol has been very valuable, not only in cauterizing the needle track, but the slight burn it leaves marks the site of a previous inoculation and prevents the administration of two doses the same day; for, in spite of all directions, some men, knowing they must take three doses, will get back in line for another dose. Thus no difficulty is experienced even with the short-lived memory of coloured troopers, for trikresol leaves a white spot for several weeks, and it is impossible to mistake the number of doses received.

"The cleaning-up process is conducted in a line, and may be as rapid as desirable, the greatest time being consumed in the filling of the syringe and the maintenance of surgical technique regarding the needles. The needle holder is steam sterilized in a towel or thoroughly flamed and placed on a sterile towel. Its capacity is such that two surgeons may have sterile needles available at all times and still allow at least one minute for boiling after use. Sixteen needles will run two surgeons constantly; eight can be in the holder, while four are boiling, and four waiting to be boiled."

Gunshot Wounds of Joints and Long Bones, in the South-West African Campaign of 1904-1907.—By Dr. Franz (*Deut. med. Wochenschrift*, May 11, 1911). The author was employed as a specialist surgeon during the campaign, and has since been entrusted with the preparation of the surgical report. The following notes are taken from a lecture which he delivered to the surgical society of Berlin.

Seventy-three per cent of the wounds were caused by the Mauser rifle (1888 model), and were mostly inflicted at very close ranges.

(A) *Wounds of Joints.*—The wounds were as follows: Wrist five, elbow thirteen, shoulder eighteen, hip six, knee twenty-six, ankle eleven.

The mortality was 5 per cent as compared with 35·9 per cent in 1870-71 and 3·1 per cent in the Boer war. Only wounds of the knee and hip-joints proved fatal, of the latter 50 per cent died. Of the other seventy-five wounds of joints, five were amputated, thirteen resected, six were incised and drained.

Considerable pyrexia, due to effusion of blood and insufficient immobilization, was frequently observed, especially when patients had to be transported for long distances. This frequently led surgeons to open up wounds thinking that the patient's condition was due to sepsis. This operative treatment is condemned by Franz, who says that early surgical interference in most cases led to a further series of operations and protracted the time of healing. The damage inflicted by a bullet depends more on the angle at which it strikes the bone than on the range. Up to 20 m. the bullet still has a wobbling movement and therefore makes a severe wound; at longer ranges the damage produced depends partly on the angle at which the bullet strikes the bone but also largely on the plane in which the bullet happens to be lying at the moment of impact. Any turning movement results in the bullet striking more or less broadside-on with the consequent disastrous effects to the bone. A bullet striking an epiphysis end-on simply perforates it with little splintering and does not immediately incapacitate the joint. Thus a man shot through the tibial epiphysis was able to walk one and a half miles: in another similar case the man continued to ride for five hours. In one case a man with a gunshot wound of the knee-joint was able to walk two and a quarter miles on the fourth day after being wounded, although a Röntgen ray picture showed that the internal tibial condyle had been split off.

As regards recovery, the following percentages show the number who actually returned to the performance of military duty.

Wounds of wrist = 0; of elbow, 30 per cent; of shoulder, 50 per cent; of hip, 6·6 per cent; of knee, 38·4 per cent. Only 10 per cent of the cases resulted in ankylosis.

(B) *Wounds of Long Bones.*—These were as follows: Humerus, thirty-one; thigh, twenty-four; bones of forearm, twenty; bones of leg, twenty-six.

In the 101 wounds of long bones there were nine deaths = 9 per cent.

This is much the same as in the Boer War; in the Franco-German War the mortality was 27·8 per cent.

Three of the deaths were due to gangrene. Most of the deaths were due to wounds of the humerus and femur; the case mortality being 9 per cent of the former and 20 per cent of the latter. Amputations and disarticulations were performed in 10 per cent of the cases with a case mortality of 36 per cent.

Septic infection may be to a great extent prevented by early immobilization, especially by using plaster of Paris bandages and proper dressings but these cannot always be applied at once. The greater the effusion of blood the more likely is sepsis to occur.

Secondary hæmorrhage was only rarely observed. Franz insists on the advisability of early operations; these should only be undertaken when the man reaches a properly equipped hospital in which he can rest quietly till recovery has taken place. The removal of fragments of bone should only be sparingly undertaken. Even when suppuration has set in only loose spicules of bone should be removed. Clearing out cavities filled with bone detritus generally leads to fibrous union with consequent loss of function in the limb and not infrequently necessitates amputation. In gunshot wounds of long bones the less the surgical interference the better the final result is.

Plugging the wound with iodoform gauze usually results in the gauze forming a dry scab at the entrance of the track which prevents the escape of pus and serous exudation and so delays healing. Free drainage is essential, but drainage tubes should be employed, not plugs of gauze.

C. E. P.

Report of the Department of Sanitation, Isthmian Canal Commission, for the month of January, 1911.—In his letter of transmission, Colonel Gorgas states that the total number of deaths among employees during the month was forty. Half of these were due to disease and half to violence; of the twenty persons who died from disease, only two were white. The annual death-rate from all causes was 5·07 per 1,000. The corresponding annual death-rates for the month of January in previous years were:—1905 = 15·40; 1906 = 40·93; 1907 = 25·62; 1908 = 12·72; 1909 = 10·98; 1910 = 10·57.

An interesting chart is appended showing the percentage of employees, who have been admitted to hospital for malaria, in each month since November, 1905, from which the following figures are taken:—

Year	Monthly average for the year.	Highest percentage.	Lowest percentage
1906	6·83	August, 10·5	April and May, 4·25
1907	3·61	,, 5·4	May, 1·6
1908	2·36	October, 4·2	,, 0·8
1909	1·81	July and Oct., 2·0 (nearly)	April, 1·25
1910	1·55	July, 8·4	February, 0·75

C. E. P.

Cerebro-spinal Meningitis in the garrison of Verdun.—Médecin-Majors Chatelet and Friand (*Archives Médecin et Pharmacie militaires*, February, 1911). These officers give a very full account of thirteen cases which occurred in Verdun between December, 1909 and May, 1910. In many of the cases the attack appears to have begun suddenly, its onset being marked by mild rigours followed by vomiting. In all cases the cerebro-spinal fluid when withdrawn by lumbar puncture was turbid and contained a very large number of polynuclear leucocytes. The principal treatment consisted in injecting 20 to 30 cc. of specific serum into the spinal canal. This was repeated in twenty-four hours.

One case which had become sub-acute and was not improving was attacked by facial erysipelas, the meningitis cleared up completely as the erysipelas disappeared. In most cases the meningo-coccus could be recovered for some time, up to two months in one case, from the naso-pharyngeal mucus. There was only one death among the thirteen cases.

C. E. P.

A New Test for Salvarsan.—By Dr. Abelin (*Münch. med. Wochenschr.*, May 9, 1911). The test consists in detaching the aromatic molecule by hydrochloric acid and replacing it with one of the phenols, resorcin for preference.

In urine the test is carried out as follows: 7 to 8 cc. of the urine to be tested is placed in a test glass and acidified with 5 to 6 drops of dilute hydrochloric acid. The mixture is then cooled and 3 to 4 drops of a half per cent solution of nitrate of soda added to it. A few drops of the mixture are then added to 5 to 6 c.c. of a 10 per cent alkaline solution of resorcin. If salvarsan is present a red colour appears immediately. In the absence of salvarsan no reaction takes place or at most only a slight yellow colour is seen. It is claimed that the test is very delicate and reliable. C. E. P.

Febrile Reaction after Injections of Salvarsan.—Wechselmann (*Deutsch. med. Woch.*, April 27, 1911). Wechselmann first reviews the various theories, advanced to account for the pyrexia which so commonly follows an intravenous injection of salvarsan, and shows that none of them can be accepted as sound. He then goes on to relate the results obtained in his own clinic; in the men's division an intravenous injection of salvarsan was frequently followed by pyrexia, whereas in the women's division this was only exceptionally observed. On one occasion two men received an intravenous injection of salvarsan and no pyrexia ensued. The same salt solution was used for four cases on the following day and each of these suffered from a severe reaction. This pointed to some change having taken place in the salt solution. The solution was usually kept in an incubation chamber at 39° C. Under these conditions salt solution forms a good nutritive medium for any heat-resisting fungi which may have escaped sterilization; after forty-eight hours' storage, turbidity may be observed in the solution. Some salt solution was boiled for half an hour, and 10 cc. of it was then added to bouillon; within forty-eight hours moulds were found, which yielded a pure culture in chains of a Gram positive bacillus. Inquiry revealed the fact that in the women's division the salt solution was always boiled for at least half an hour while in the men's division ten to fifteen minutes was the usual time. In consequence of the above observation the practice now is to filter the salt solution through a porcelain filter, then boil it for half an hour, cool it on ice and use it immediately afterwards. Since adopting this plan there have been no further severe reactions. In a few neurotic patients there may be a slight rise of temperature, but this is only of short duration and not accompanied by any malaise. C. E. P.

Skin Disinfection with Tincture of Iodine.—Dr. C. Decker (*Deut. med. Wochen.*, No. 23, 1911.) Decker contributes a short paper on this subject based on his observations in the surgical division of the Vinzenz Hospital at Cologne.

Before each operation the skin was painted twice with 10 per cent tincture of iodine; after the operation the painted area was rubbed over with 96 per cent alcohol and the sutures painted with tincture of iodine. Sodium hyposulphite solution was tried in place of the alcohol; it failed to remove the iodine and in several cases appeared to cause eczema. Tincture of iodine frequently produced a painful burning sensation of the skin and in some cases a moist eczema. Some of the assistants suffered from persistent catarrh of the upper air passages. Post-operative pneumonia also occurred more frequently among the cases in which iodine was used as a disinfectant.

Many experiments were made to test the degree of disinfection produced by the tincture of iodine. In the first series of experiments a small portion of the skin, which had been twice painted with tincture of iodine, was washed with sterile bouillon; it was then placed in a tube of bouillon and incubated at 37° C. for twenty-four hours. The bouillon showed a growth of diplococci and streptococci. The superficial epithelium of a portion of skin, which had been twice painted with tincture of iodine, was scraped off and incubated in a tube of bouillon. This remained sterile. In another series, scrapings of the prepared skin, taken both before and after the operation, were plated out. In most cases growths of staphylococci and streptococci occurred.

Decker concludes that tincture of iodine does not kill the pathogenic organisms in the skin but fixes them to the epithelium and so prevents them from gaining entrance to the wound. C. E. P.

Crime due to Alcoholism.—Méd.-Major Dr. Jude (*Le Caducée* of August 20, 1910). Dr. Jude contributed a paper to the Congress of French Specialists on Mental Disease at Brussels, August, 1910, from which the following notes are taken:—

The total number of courts martial of which the proceedings were examined by Dr. Jude was 397. Of this total, in 141 cases, or 35·5 per cent, the crime was committed when the man was under the influence of alcohol. Classifying the crimes into unpremeditated and premeditated, there were 164 of the first class of which 111, or 67 per cent were due to the effect of alcohol, and 233 of the second class of which only 30, or 12·8 per cent, could be ascribed to indulgence in alcohol. In almost every alcoholic case the taste for drink had been acquired before enlisting and not in the regiment. No distilled liquors are sold in the French regimental canteens; medical and regimental officers instruct the men on the dangers of the abuse of alcohol. Nearly all cases of drunkenness are traceable to unlicensed grog shops and brothels, both of which unfortunately abound in the neighbourhood of barracks. C. E. P.

Losses in the Russo-Japanese War, 1904-5.—Generalarzt Körting, (*Deut. Militarärzt. Zeitschr.*, April 5, 1911). In 1908 Körting published some figures showing the losses in the Russo-Japanese War. These he republishes below, together with the figures corrected according to the latest information furnished by the official report of the Russian General Staff. At the end of September, 1905, the strength of the Russian forces in the field was:—

(*a*) Officers	17,230
(*b*) N.C.O.'s and men, at the front	786,212
(*c*) „ „ elsewhere..	155,929
Total	959,371

The total number of men mobilized during the war has not yet been published. Of the reserves, 1,174,913 men were called up, and at the end of active operations this class formed 58 per cent of the Army in the field.

The Japanese have not published any further official reports as to their strength. According to the Russian report the total Japanese strength is placed at 1,185,000 and their fighting strength at the end of the war is estimated at 442,000.

The casualties were as follows:-

RUSSIANS.

	Figures corrected in 1911	Figures published in 1908
(*a*) Killed	19,746	28,800
(*b*) Wounded	122,690	141,800
(*c*) Died of wounds	3,889 (= 3·17 per cent. of *b*)	5,200 (= 3·7 per cent. of *b*)
(*d*) Missing	39,605	38,000 (includes 25,133 prisoners)
(*e*) Sick	1,623,784	358,400
(*f*) Died of disease	7,871 (= 0·47 per cent. of *e*)	9,300 (= 2·6 per cent. of *e*)
(*g*) Total deaths (*a*, *c*, *f*) ..	31,506	43,300

JAPANESE.

	Figures corrected in 1911	Figures published in 1908
(*h*) Killed	47,152	47,400
(*i*) Wounded	220,813	173,400
(*k*) Died of wounds	47,387 (= 21·5 per cent. of *i*)	11,500 (= 6·6 per cent. of *i*)
(*l*) Missing	..	..
(*m*) Sick	236,223 (?)	334,100
(*n*) Died of disease	27,158 (= 11·5 per cent. of *m*)	27,200 (= 8·1 per cent. of *m*)
(*o*) Total deaths (*h*, *k*, *n*) ..	121,697	86,100

It is impossible to work out the ratios as the average annual strengths of the two armies are not definitely known yet.

The great increase in the number of sick shown in the later figures for the Russian Army is due to the fact that all men who were treated in regimental hospitals or as out-patients are now included in the returns of sick; the earlier figures only showed those treated in field and clearing hospitals. The Japanese figures must be accepted with considerable reserve as the percentage of deaths from wounds is obviously too high, whilst the number of sick must have been very much greater than that shown.

C. E. P.

The Cleansing and Disinfection of Cloth Garments.—By M. Milmaers (*Archives méd. Belges.*, April, 1911). Uniforms which have been worn for a time and returned to store are cleansed and disinfected by contract. The procedure is as follows:—

The articles are placed for fifteen minutes in a drum containing benzine. This removes all oily or greasy stains; from this they are transferred to a centrifugal cylinder with a speed of 1,000 revolutions a minute. This removes the benzine. They are then put into a revolving drum for ten minutes through which tepid water is run. This removes sugars and other substances soluble in water. The garments are then dried in a centrifugal drum revolving 1,000 times per minute, and afterwards in a hot cupboard at 80° C. They are then placed on a metal table covered with a double layer of perforated metal, heated by steam at a pressure of 5 atmospheres, and thoroughly brushed; the colour is not affected. The garments are then dried in the air and finally ironed. The cost of the above treatment varies according to the size of the article, thus: a greatcoat with its cape costs 1s. 9d., trousers 7d. Articles which would have to be condemned on account of their filthy condition can be rendered quite serviceable. C. E. P.

An Epidemic of Dysentery Caused by a Carrier.—Stabsarzt Boehncke (*Munch. med. Woch.*, May 30, 1911). In the first ten days of July, 1910, twenty-nine men of the 20th Pioneer Battalion reported sick with diarrhœa accompanied by severe abdominal pain. Most of the men belonged to Nos. 1 and 2 companies. A bacteriological examination was made of their fæces and in a large number of the cases Shiga-Kruse bacilli were found. Up to July 22 forty-five cases of dysentery occurred in which the diagnosis was established by bacteriological methods, while thirty-three other cases of intestinal catarrh came under treatment, but in which the Shiga-Kruse bacillus was not recovered. The bacillus was also recovered from the stools of twenty-five apparently healthy men. Owing to the large number of men attacked suspicion at first fell on the water and food, but the epidemic was almost confined to Nos. 1 and 2 companies, while the same food and water was consumed by the whole battalion. No. 1 Company had been billeted for a week at the end of the preceding month in a village, the sanitary condition of which was not above suspicion; during this time the company had been engaged in field training while the weather was extremely inclement. The most careful search failed to find any source of infection in the village.

One man employed as a tailor in No. 1 company had been treated in hospital during the previous autumn for dysentery due to the Shiga-Kruse bacillus and after convalescence had returned to duty. On inquiry this man owned to having suffered from diarrhœa with abdominal pain during the latter part of June, 1910. Being employed indoors he did not report sick but continued to carry on his duty as a tailor. On examining his fæces some Shiga-Kruse bacilli were found and his serum agglutinated a fresh culture of Shiga-Kruse bacilli in a dilution of 1 in 120 in a quarter of an hour. The men of Nos. 1 and 2 companies used the same latrines as this tailor. The exposure to which the men of No. 1 company had been subjected at the end of June probably had the effect of predisposing them to infection.

Boehncke points out how important it is to keep convalescents from dysentery under observation till it has been determined that they are no longer excreting dysenteric bacilli. C. E. P.

A Study of the Influence of Rice Diet and of Inanition on the Production of Multiple Neuritis of Fowls and the bearing thereof on the Etiology of Beri-beri.[1]—By Major Weston P. Chamberlain, Medical Corps; Captain Horace D. Bloombergh, Medical Corps; Captain Edwin D. Kilbourne, Medical Corps. (Constituting the United States Army Board for the Study of Tropical Diseases as they exist in the Philippine Islands.) *The Military Surgeon*, vol. xxix., No. 2: "As stated before, our original object in conducting these experiments was not to prove or disprove the identity of multiple neuritis in fowls and beri-beri in man, but to test the neuritis-producing qualities, when fed to fowls, of certain native and imported rices and to use the information thus acquired as an aid in selecting the variety of grain and the degree of milling best suited for the Filipino troops. Nevertheless, as the work progressed, certain points of dissimilarity between beri-beri and poly-neuritis gallinarum became apparent and it may not be inappropriate to mention them here.

"Fowls are especially susceptible to neuritis, and get the disease under circumstances which have no effect on the nerves of some other animals. Monkeys, when fed on a diet of boiled polished rice and water, remained well, although the experiments continued for more than three months. They had lost in weight and became weak but did not show signs of neuritis at any time. We can find in the literature no mention of neuritis in man having developed as a result of inanition among the professional "fasters," or among groups of men who were starving.

"It would seem that the peripheral nerves of fowls are less resistant to degenerative influences than those of animals, and are among the first tissues to suffer when the animals are starved or given a deficient or ill-balanced diet. Our experience bears out the statement of Shibayama that polyneuritis of fowls occurs in cachectic animals, while beri-beri is prone to appear among men previously well nourished.

"Another point of difference is that œdema has been very rarely seen in fowls with neuritis while it is common in beri-beri in man. None of our fowls with neuritis showed any œdema.

"We are therefore inclined to join forces with those writers who consider that polyneuritis gallinarum and beri-beri are not identical, but we are fully in accord with Fraser and Stanton in their statements, (*a*) that its capacity for producing polyneuritis in fowls in an *accurate indicator* of the beri-beri-producing quality of a rice, and (*b*) that a low phosphorus content is a *reliable index* of the dangerous character of the grain. We have found, however, that in neuritis-producing rice and in beri-beri-producing dietaries the potassium is even more reduced than the phosphorus. The comparison between the two elements in rices is shown in Table 1. The diminution in phosphorus as compared with potassium in beri-beri-producing diets was treated of in a former communication from the Board and is referred to in the discussion on polished rice combined with various salts (Table 2). The latest work of Fraser and Stanton seems to indicate that much the greater part (85 per cent) of the phosphorus in rice polishings is of no value in preventing polyneuritis of fowls. It now remains to be shown whether the real neuritis-preventing factor in polishings is the small per cent of phosphorus not yet accounted for, or the potassium, or some other element.

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[1] Reprint from *The Military Surgeon.*

"*The inference from the foregoing is that neuritis in fowls and beri-beri in man is just as likely to be due to deficiency in potassium salts as to deficiency in phosphorus salts.* The results of our starvation experiments suggested that, as far as fowls are concerned, it might be a *deficiency of both phosphorus and potassium* which led to nerve deterioration. The experiments in classes 4, 5, 6, 7, and 8 indicated that adding to polished rice either phosphorus or potassium, or both elements, in two of their *common inorganic forms*, did not render the grain any safer as an exclusive article of diet for fowls. We are about to undertake another series of experiments combining with polished rice other mineral salts such as potassium carbonate, potassium citrate, potassium phosphate and magnesium phosphate.

"CONCLUSIONS DRAWN FROM THE OBSERVATIONS.

(1) Fowls develop multiple neuritis when fed exclusively on polished rice, whether Filipino No. 1, or Saigon choice rice is used.

(2) Forcibly feeding polished rice to such fowls as have no appetite for it will not prevent the occurrence of neuritis.

(3) Those fowls that voluntarily eat heartily of polished rice are able thereby to maintain their body weight and to defer or to prevent the development of multiple neuritis.

(4) The administration of certain inorganic salts of phosphorus and of potassium, either alone or combined, to fowls subsisting on polished rice neither prevented multiple neuritis nor deferred its onset.

(5) Fowls fed unhusked rice, *palay*, do not acquire multiple neuritis.

(6) Fowls fed undermilled (unpolished) rice do not acquire the disease.

(7) Whether the undermilled rice has a red or a yellowish-white pericarp is immaterial.

(8) Fowls fed on undermilled rice combined with large amounts of sodium chloride do not develop multiple neuritis.

(9) Fowls from which all food is withheld and only water allowed develop multiple neuritis.

(10) Fowls starved on reduced amounts of a neuritis-preventing undermilled rice acquire multiple neuritis.

(11) Fowls kept entirely without food and those which are given all they will eat of polished rice lose weight with almost equal rapidity, in the great majority of cases.

(12) A loss, at least 21 per cent, of the body weight almost invariably occurs before any signs of multiple neuritis become apparent.

(13) The signs, symptoms, and nerve appearances are identical in neuritis produced by inanition, and in that caused by feeding polished rice.

(14) Spasticity is a late development in some fowls which develop neuritis and are then saved from death by the institution of mixed feeding.

(15) In neuritis-producing rice and in beri-beri-producing dietaries both the phosphorus and the potassium are markedly reduced in amount, the latter in greater degree than the former.

(16) As an *index* of the beri-beri-producing power of a given rice, reduction in the potassium content is probably quite as reliable as reduction in the phosphorus content."

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Original Communications.

TRYPANOSOME DISEASES OF DOMESTIC ANIMALS IN UGANDA.[1]

II.—TRYPANOSOMA BRUCEI (PLIMMER AND BRADFORD).

BY COLONEL SIR DAVID BRUCE, C.B., F.R.S.; CAPTAINS A. E. HAMERTON, D.S.O., AND H. R. BATEMAN, R.A.M.C.; and CAPTAIN F. P. MACKIE, I.M.S.

INTRODUCTION.

THIS species was only met with on one occasion during the work of the Commission in 1909. This was in the blood of an ox from the Mabira Rubber Estate (latitude 0° 30′ N., longitude 32° 55′ E.). The manager wrote that the animal came from the Bukedi District, about 100 miles to the north (latitude 1° 50′ N., longitude 32° 40′ E.). Not much is known of this district, as it has only recently come under administration, and therefore it is impossible to say whether the ox was infected in Bukedi or on the journey south.

This is the species of trypanosome which was first discovered by Bruce, in 1894, in Zululand, to be the cause of nagana, or tsetse-fly disease. During the work of the Sleeping Sickness Commission of the Royal Society in 1903, it was also met with in a herd of cattle from the same district of Bukedi, and then described as the "Jinja trypanosome."[2] It is impossible to name with any certainty the trypanosome seen in 1903, which affected the horses, camels and dogs of the Abyssinian Boundary Commission. This was described as the "Abyssinian trypanosome." Its morphology[3] shows it to be similar to *Trypanosoma brucei*, so that in all likelihood it was either this species or the closely related *T. evansi*. As camels were infected, it was more probably the latter.

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[1] Reprinted from *Proceedings of the Royal Society*, B, vol. lxxxiii.

[2] "Reports of the Sleeping Sickness Commission of the Royal Society," No. VI, p. 112.

In regard to the third kind of trypanosome seen in 1903, and referred to as the "Mule trypanosome," no opinion can, at present, be given.

As to the remaining trypanosome seen in 1903, and known as "Pordage's ox trypanosome,"[4] an examination of the old specimens at once disclosed its identity. It is *T. vivax* (Ziemann); and this accounts for the fact that the blood of the ox injected into a monkey and a dog had no effect, these animals being refractory to *T. vivax*.

MORPHOLOGY OF TRYPANOSOMA BRUCEI, UGANDA, 1909.

This species is interesting on account of its well-marked dimorphism, in which *T. gambiense* resembles it. There are two varieties—the long and slender with free flagellum, and the short and stumpy without free flagellum. The shortest are only 13 and the longest 35 microns in length.

In this paper the long and slender are considered to be those which measure from 25 to 35 microns; the short and stumpy from 13 to 21 microns. Those trypanosomes which measure 22, 23 or 24 microns are called intermediate. The general character of these forms may be given, shortly, as follows: The long and slender have a narrow extended posterior extremity, an elongated oval nucleus, a well-developed undulating membrane thrown into many waves, folds or plications, and a long free flagellum. The short and stumpy, on the other hand, have a rounded posterior extremity somewhat like the head of a turtle, a round or oval nucleus lying transversely to the long axis of the trypanosome, a well-developed undulating membrane thrown into bold folds, and no free flagellum. The intermediate have a short free flagellum, a posterior extremity resembling that of the short and stumpy form but narrower, an oval nucleus, and a well-developed undulating membrane.

A. *Living, Unstained.*

No observations were made in Uganda on this species of trypanosome in the living, unstained condition.

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[3] "Reports of the Sleeping Sickness Commission of the Royal Society," No. VI., plate 2, p. 118.

[4] *Ibid.*, No. IV, p. 48.

B. *Fixed and Stained.*

The blood-films were fixed, stained, and measured as described in the *Proceedings.*[5]

Length.—The following table gives the length of this species as found in Uganda, in the ox, monkey, dog, guinea-pig and rat. Only one trypanosome was found in the blood of the original Mabira ox. It measured 24 microns. In the monkey only eleven trypanosomes could be found. In all the others, twenty trypanosomes have been drawn and measured. These were taken as they came, except that dividing forms were passed by.

TABLE I.—MEASUREMENTS OF TRYPANOSOMA BRUCEI, UGANDA STRAIN, 1909.

Date	Number of experiment	Animal	Day of disease	Method of fixing and staining	In microns		
					Average length	Maximum length	Minimum length
1909 Aug. 12	1461	Ox.. ..	Not known	Osmic acid and Giemsa	24·0	24·0	24·0
Sept. 30	1627	Monkey ..	26th	,, ,,	24·8	30·0	19·0
Aug. 26	1479	Dog ..	41st	,, ,,	26·5	32·0	22·0
,, 30	1479	,, ..	45th	,, ,,	22·0	29·0	16·0
Sept. 30	1479	,, ..	76th	,, ,,	23·5	34·0	20·0
Oct. 11	1644	Guinea-pig	33rd	,, ,,	20·7	34·0	15·0
,, 18	1644	,,	40th	,, ,,	27·1	34·0	17·0
Sept. 9	1482	Rat ..	5th	,, ,,	24·7	30·0	21·0
,, 13	1482	,, ..	9th	,, ,,	23·5	31·5	19·0
,, 16	1643	,, ..	8th	,, ,,	19·6	21·0	18·0
					23·6	34·0	15·0

It will be seen from the above table that *T. brucei*, Uganda strain, 1909, varies in length between 15 and 34 microns. Doubtless, individuals could be found slightly longer or shorter than this if they were hunted for. In Table I, as already mentioned, the twenty trypanosomes drawn are the first met with, except that dividing forms are left out, and this rule is adhered to throughout.

The average length of the 172 trypanosomes dealt with in Table I is 23·6 microns; but, as this does not give much information, the following table has been prepared. This represents by means of dots the length of each of 160 trypanosomes, in eight preparations of 20 each. Although *T. brucei* is described as a dimorphic species, it must not be supposed that there is any strict line of demarcation between the long and slender and short and

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[5] B, 1909, vol. lxxxi, pp. 16 and 17.

TABLE II.—REPRESENTS THE DISTRIBUTION IN RESPECT TO LENGTH OF TRYPANOSOMA BRUCEI, UGANDA STRAIN, 1909.

Experiment No	Short and stumpy							Intermediate			Long and slender											Average in microns
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
1479								●●●		●	●●	●●●●	●●	●●●●	●	●●		●				26·5
1479		●	●		●	●●●	●●	●●	●●●●	●●●				●	●●							22
1479						●●●●	●●●●	●●●●		●	●●●					●			●●	●		23·5
1644	●	●	●●	●●●●	●	●	●●●	●●	●●	●				●						●		20·7
1644			●		●	●					●●●	●	●●	●	●●●●	●●●	●		●	●		27·1
1482							●	●●	●●●●●	●●●	●●●	●	●	●●	●	●						24·7

1482						●●●	●●●●	●●●	●	●		●		●	●●●	●●			●			23·5
1643					●●	●●●●	●●●●●●●●●●●●●	●														19·6
Totals	..	1	2	4	6	10	26	14	14	12	9	12	6	6	12	10	7	1	2	3	3	
Percentage	..	0 6	1·3	2·5	3·8	6·2	16·2	8·7	8·7	7·5	5·6	7·5	3·8	3·8	7 5	6·2	4·4	0·6	1·3	1·9	1·9	

stumpy forms. There are the intermediate forms. This table is also useful in showing at a glance the distribution of the various lengths.

This division of *T. brucei* into long, intermediate, and short forms is, of course, quite artificial, as the one form passes into the other by insensible gradations. It may, however, prove of some use in the identification of this species. In the same way a series of measurements of the various parts of the trypanosome body may also prove useful. The following table gives the distance between the posterior extremity and the micronucleus, the micronucleus and the nucleus, the size of the nucleus, the distance between the nucleus and the anterior extremity, and the length of the free flagellum.

Breadth.—The long and slender forms average 1·5 micron; the short and stumpy 2·5 microns.

Shape.—As already mentioned, this is a markedly dimorphic species, composed of long, slender forms with free flagella, and short, stout forms without free flagella. It is curious that the long forms may preponderate in the blood one day and the short forms another. For example, as will be seen from Table I, the trypanosomes in the guinea-pig's blood on October 11 were mostly short forms, giving an average of 20·7 microns, while a week later they were mostly long forms, giving an average of 27·1 microns. Note also Rat 1643, with an average of 19·6 microns, and Rat 1482, with an average of 24·7 microns.

This species may be compared with Dutton and Todd's *T. dimorphon*, and in truth the coloured drawings given by them in their original plate[6] (figs. VII, IX and X) are very similar, if not identical, in shape and size with *T. brucei*. Fig. X, the long, slender form with free flagellum, is 30·5 microns in length. Fig. VII, the short, stumpy form without free flagellum, is 16 microns in length. As to fig. VI, on the same plate, stated to represent the "tadpole form," one would suspect from its general shape and appearance that it had no connection with the others. But in regard to figs. VII and X, anyone comparing Dutton and Todd's plate with the coloured plate in *Proceedings*, B, vol. lxxxiii., must be struck with the close resemblance between these two forms of *T. dimorphon* and *T. brucei*. Is it possible that Dutton and Todd were dealing with *T. brucei* when they described *T. dimorphon*?

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[6] "First Report of the Trypanosomiasis Expedition to Senegambia (1902),' University Press of Liverpool, 1903.

TABLE III.—MEASUREMENTS OF THE VARIOUS PARTS OF TRYPANOSOMA BRUCEI UGANDA STRAIN, 1909.

Experiment	Posterior extremity to micronucleus	Micronucleus to nucleus	Nucleus	Nucleus to anterior extremity	Free flagellum	Total length
			Long and Slender Forms.			
1644	4	5	3·5	11·5	10	34
1644	3	7	4	10	10	34
1644	3	6·5	3·5	13	7	33
1644	2·5	7·5	3	10	8	31
1644	2	7	3·5	12·5	5	30
1644	2	7	3	11	7	30
1644	2	7	3	8	10	30
1482	1	7	3	11	8	30
1627	2	6	2·5	10 5	9	30
1627	3	7 5	2·5	13	4	30
1644	2	6	3	12	6	29
1644	3·5	5·5	3·5	9·5	7	29
1644	2	6·5	3	12·5	5	29
1644	2·5	7	3	6·5	10	29
1482	2	6	3·5	9·5	8·8	29
1644	3	6	3	8	8·8	28
1644	2	7	3	16	-	28
1482	1·5	6·5	2·5	13·5	4	28
1482	1·5	8	2·5	8	8	28
1627	1	7·5	2·5	11	6	28
1627	1	7·5	2·5	8	9	28
1644	2	7	3	10	5	27
1644	2	6	3·5	8·5	7	27
1627	1	7	3	9	7	27
1482	2	7 5	2	11·5	4	27
1644	2	6	2·5	10·5	5	26
1482	2	7	3	9 5	4·5	26
1644	2	6	3	7	7	25
1644	2	7	3·5	8·5	4	25
1644	1·5	5·5	3	10	5	25
1482	2	5·5	2·5	10	5	25
1482	1	6	3	11	4	25
1482	2	6·5	3	8·5	5	25
1627	2	6	2·5	8·5	6	25
Average ..	2·1	6·6	3	10·2	6·4	--
			Intermediate Forms.			
1644	1	6	2·5	14 5	—	24
1482	2	6·5	3·5	8	4	24
1482	1	6	3	10	4	24
1482	1·5	6	3	9·5	4	24
1644	1	5	2·5	14·5	–	23
1644	1	7·5	2·5	12	—	23
1482	1	6	3	8 5	4·5	23
1482	2	5	2·5	8·5	5	23
1482	2	5	4	9	3	23
1482	1	5·5	3	9	4·5	23
1482	2	5	3	10	3	23
1627	1·5	7	3·5	4	7	23
1644	2	6·5	3	5·5	5	22
1644	1	7	3·5	6·5	4	22
1482	2	5·5	2	12·5	—	22
1482	1·5	6	2·5	7	5	22
1627	1	6	2	7	6	22
Average ..	1 4	6	2·9	9·2	3·5	—

TABLE III.—*Continued.*

Experiment	Posterior extremity to micronucleus	Micronucleus to nucleus	Nucleus	Nucleus to anterior extremity	Free flagellum	Total length
			Short and Stumpy Forms.			
1644	1	6	3	11	—	21
1644	1	5·5	2·5	12	—	21
1644	1	5·5	2·5	12	—	21
1482	2	5	3	11	—	21
1643	1	4·5	2·5	13	—	21
1627	1·5	6·5	3	7·5	2·5	21
1644	2	3	3	12	—	20
1644	1	5	2	12	—	20
1643	1	4·5	2	12·5	—	20
1643	1	4	2·5	12·5	—	20
1643	1	6	2·5	10·5	—	20
1643	1	5	2·5	11·5	—	20
1643	1	5·5	2	11·5	—	20
1643	1	5	3	11	—	20
1643	1	5·5	2·5	11	—	20
1643	1	4·5	2·5	12	—	20
1643	1	4	2·5	12·5	—	20
1643	1·5	5·5	2	11	—	20
1643	1	4	2·5	12·5	—	20
1643	1	5	2	12	—	20
1643	1	4·5	2	12·5	—	20
1627	1	6	2	11	—	20
1644	1	5	2	11	—	19
1644	1	3·5	2	12·5	—	19
1643	1	5	2·5	10·5	—	19
1643	1	5	2	11	—	19
1643	1	4·5	2	10·5	—	19
1643	1	5·5	3	10·5	—	19
1627	1	7	3	8	—	19
1644	1	4	2·5	10·5	—	18
1644	1	4	2·5	10·5	—	18
1644	1	3·5	3	10·5	—	18
1644	1	6	2·5	8·5	—	18
1643	1	4·5	2·5	10	—	18
1643	2	4	2·5	9·5	—	18
1644	1	5	3	8	—	17
1644	1	4·5	2·5	9	—	17
1644	1	6	2·5	7·5	—	17
1644	1	5·5	2	7·5		16
1644	1	5	2	7		15
Average ..	1·1	4·9	2·4	10·7	—	—
Average of three forms	1·5	5·8	2·8	10	3·3	—

Contents of Cell.—The protoplasm which is stained a pale blue is often dotted over with chromatin granules, especially in the anterior half. In well-stained preparations the distribution and number of these granules is sufficient, according to McFadyean, to differentiate this species from *T. evansi.* This was also pointed out by Laveran and Mesnil some years ago, when they wrote: "Avec un peu d'habitude on arrive au contraire à distinguer les deux Trypanosomes, quand on dispose de préparations bien colorées et riches en parasites."[7]

Nucleus.—Is oval or elongated in shape in the long forms, a short oval in the intermediate, round or oval in the short, stumpy forms, and situated about the middle of the body.

Micronucleus.—Small and round, situated, on an average, 2·1 microns from the posterior extremity in the long and slender forms, 1·4 microns in the intermediate, and 1·1 microns in the short and stumpy.

Undulating Membrane.—This is well developed in this species and thrown into many folds and undulations. In this it differs markedly from *T. vivax.*

Flagellum.—The flagellum in the long and slender forms is free and, on an average, 6·4 microns in length. In the short and stumpy forms there is no free flagellum.

TABLE IV.—MEASUREMENTS OF THE ORIGINAL STRAIN OF TRYPANOSOMA BRUCEI, DISCOVERED IN ZULULAND IN 1894.

Trypanosoma brucei, Zululand, 1894.

Date	No. of experiment	Animal	Method of fixing and staining	In microns		
				Average length	Maximum length	Minimum length
1.11.95	212	Horse ..	Osmic acid ; carbolfuchsin	22·4	32	14·5
1.11.95	212	,, ..	,, ,,	20·6	32·5	14
7.11.95	219	Donkey..	,, ,,	23	35	14·5
23.11 95	214	Ox ..	,, ,,	18	25·5	13
4.7.97		Monkey .	,, ,,	20·5	32	15
6.1.95	190	Dog ..	,, ,,	25	35	17
10.12.95		,, ..	,, ,,	24	32	17
14.1.96	233	,, .	,, ,,	27·8	34	18
25.1.96	244	,, ..	,, ,,	20·6	33	15
7.2.96	229	,, ..	,, ,,	28·7	35	19
9.7.97	433	,, ..	,, ,,	19·7	29	17
				22·8	35	13

COMPARISON OF T. BRUCEI, UGANDA, 1909, WITH T. BRUCEI, ZULULAND, 1894 (see Plate 1).

When *T. brucei* was discovered in Zululand, in 1894, it was naturally thought to be the one and only trypanosome in Africa, and a detailed description seemed unnecessary. Now, however, since the number of species in Africa has increased to such an alarming extent, it is necessary to add to the old description by

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[7] "Trypanosomes et Trypanosomiasis," 1904.

TABLE V.—REPRESENTS THE DISTRIBUTION IN RESPECT TO LENGTH OF TRYPANOSOMA BRUCEI, ZULULAND STRAIN. 1894.

Experiment No.	Short and stumpy									Intermediate			Long and slender											Average in microns
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
212			●	●●	●●	●●●	●			●	●			●●	●	●	●●	●●		●				22·4
212		●	●●●	●●	●●	●●●●	●						●●	●●	●●					●				20·6
219			●●●	●●●	●	●	●						●	●	●●	●●	●●●		●				●	23·0
214	●●●	●●	●	●	●●●●●	●		●	●●●	●	●		●											18·0
—	●		●●	●●	●●●●●	●	●●					●	●		●	●	●	●		●				20·5
—					●●	●●●	●	●	●	●	●●			●	●	●	●	●●	●●	●				24·0
233						●●	●				●		●		●●●	●●	●	●	●●●	●	●●	●		27·8

244			●	●		●●●●●●●	●●●●●	●●								●	●	●			●			20·6
229							●●					●	●			●●●●	●●●	●	●●●●	●●			●●	28·7
433					●●●	●●●●●●●●●●	●●●					●		●		●	●							19·7
Totals ..	4	3	11	11	20	32	17	4	4	3	5	3	7	7	10	13	13	8	10	8	3	1	3	
Percentage ..	2	1·5	5·5	5·5	10	16	8·5	2	2	1·5	2·5	1·5	3·5	3·5	5	6·5	6·5	4	5	4	1·5	0·5	1·5	

more detailed measurements. Luckily, many of the old Zululand preparations are still extant, so that it has been possible to do this. It must, however, be borne in mind that the Zululand preparations are some fifteen years old, and were stained with carbol-fuchsin and not by Giemsa as in the case of the Uganda strain. They may, therefore, have shrunk to a greater extent than the more recently stained specimens.

The average length of the *T. brucei*, Uganda, 1909, was 23·6 microns, the maximum 34 microns, and the minimum 15 microns. The measurements of the two strains therefore correspond very closely.

Tables II and V can be compared in the following chart, which gives the curves of the distribution in respect to length of *T. brucei*, Uganda, 1909, and *T. brucei*, Zululand, 1894.

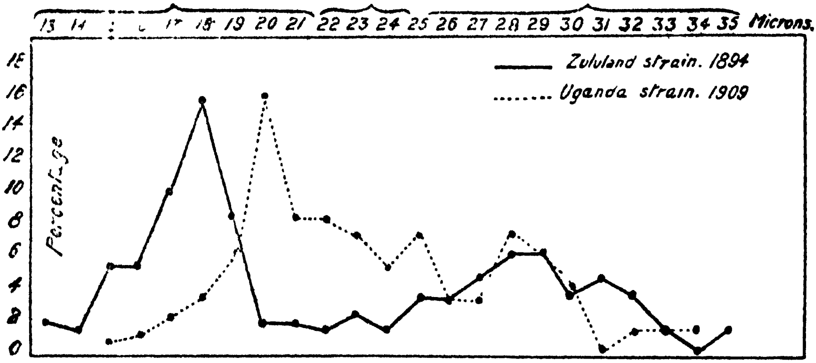


Chart giving curves of the distribution, by percentages, in respect of length, made up from Tables II and V.

From these curves it will be seen that there is a marked resemblance between the two strains when represented in this way.

ANIMALS SUSCEPTIBLE TO T. BRUCEI.

Table VI shows the effect of inoculating various animals with *T. brucei*, Uganda strain, 1909.

The number of experiments carried out on the various animals is too small for comparative purposes, but sufficient to show that cattle and the smaller laboratory animals are susceptible to this trypanosome.

CULTIVATION OF T. BRUCEI, UGANDA STRAIN, 1909.

No attempt was made in Uganda to cultivate this trypanosome.

CARRIER OF T. BRUCEI.

No experiments were made in the laboratory at Mpumu with *Glossina palpalis* as a carrier of this trypanosome, and no evidence is to hand as to how it is conveyed from sick to healthy animals in the district of Bukedi.

TABLE VI.

Date	Experiment	Source of virus	Period of incubation, in days	Duration of disease, in days	Remarks
			Cattle.		
1909 Aug. 11..	1461	Nat. infec.	?	–	Killed on 79th day.
			Goat.		
Aug. 16..	1478	Ox 1461 ..	-	–	Never showed trypanosomes; under observation 37 days.
			Monkey.		
Aug. 16..	1480	Ox 1461 ..	–	–	Died 10 days after inoculation; never showed trypanosomes.
Sept. 4..	1627	Dog 1479..	13	69	Died of *T. brucei.*
			Dog.		
ug. 16..	1479	Ox 1461 ..	8	49	Died of *T. brucei.*
			Rabbit.		
Sept. 8..	1645	Rat 1482..	26	–	Still alive after 67 days.
			Guinea-pig.		
Aug. 16..	1481	Ox 1461 ..	–	–	Never showed trypanosomes; under observation 18 days.
Sept. 3..	1481	Dog 1479..	5	–	Still alive after 71 days.
,, 8..	1644	Rat 1482..	26	–	,, ,, 67 ,,
			Rat.		
Aug. 16..	1482	Ox 1461 ..	–	–	Never showed trypanosomes; under observation 18 days.
Sept. 4..	1482	Dog 1479..	5	23	Died of *T. brucei.*
, 8..	1643	Rat 1482.	8	22	,, ,,
			Mouse.		
Aug. 16..	1483	Ox 1461 ..	—	–	Accidentally killed on 9th day; never showed trypanosomes.

CONCLUSION.

With the evidence available, the Commission consider themselves justified in considering the trypanosome recovered from the Uganda ox to be identical with *T. brucei*, the cause of Nagana in Zululand and other parts of South Africa.

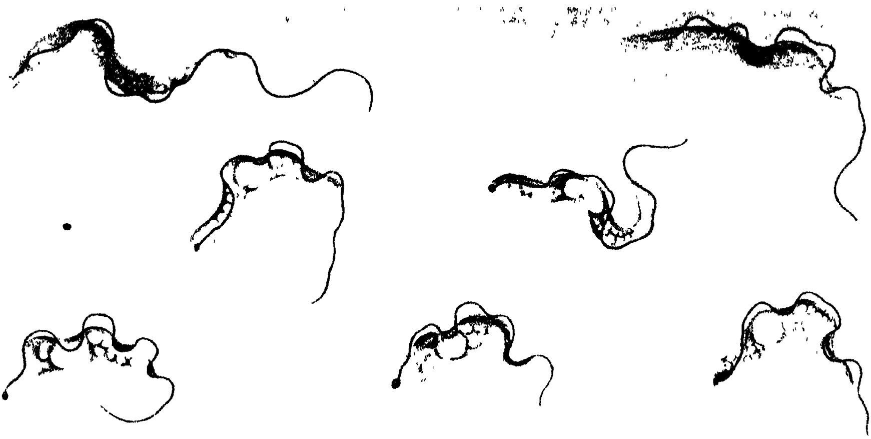
DESCRIPTION OF PLATE.

PLATE 1.

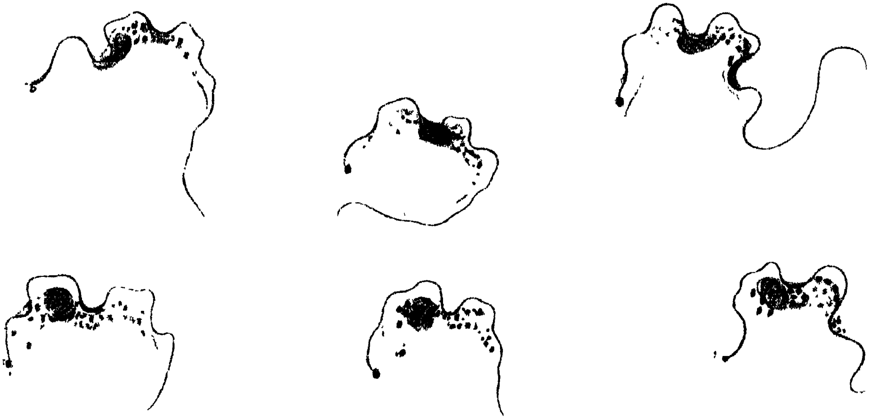
(1) *Trypanosoma brucei*, Zululand, 1894, stained carbol-fuchsin. × 2000.
- Figs. 1 and 2.—Long and slender forms.
- Figs. 3 and 4.—Intermediate forms.
- Figs. 5, 6 and 7.—Short and stumpy forms.

(2) *Trypanosoma brucei*, Uganda, 1909, stained Giemsa. × 2000.
- Figs. 8 and 9.—Long and slender forms.
- Fig. 10.—Intermediate form.
- Figs. 11, 12 and 13.—Short and stumpy forms.

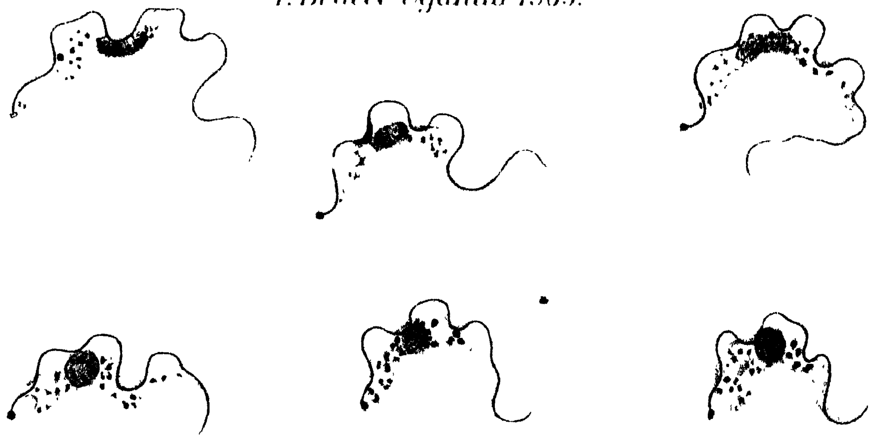
(3) *Trypanosoma dimorphon* (?), Khartoum. × 2000.
- Figs. 14 and 15.—Long and slender forms.
- Fig. 16.—Intermediate form.
- Figs. 17, 18 and 19.—Short and stumpy forms.



T Brucei Zululand 1894



T. Brucei Uganda 1909.



T. Dimorphon ? Khartoum

INCINERATION IN CANTONMENTS IN INDIA.

By Captain P. S. LELEAN.
Royal Army Medical Corps.

Cantonment incineration presents many inherent difficulties which do not hamper the practice of this conservancy method in the field, and, in view of these special difficulties, the whole problem calls for re-consideration as we face afresh the familiar questions :—

(*A*) Is incineration practicable in cantonments?
(*B*) Will it increase the cost of conservancy?
(*C*) Will its adoption increase military efficiency?

A. Practicability.

Unfortunately this is not merely a matter of physics—rather is it a question dominated by the obstructive æsthetic, the myopic economist and the unspeakable *mehtar*. We want to know that we can incinerate excreta without causing undue offence, with the material at hand and without running up the conservancy bill, and without overtaxing the intelligence and reliability of the sweeper.

The hygienic desiderata are that potentially infective dejecta should be rapidly destroyed, while being protected meanwhile from all disseminating agencies, especially from flies which incidentally should be reduced to minimal numbers.

(1) *Disposal of Urine.*

The matter would be reduced to comparative simplicity if some means could be devised for safely disposing otherwise of the great bulk of the 300 odd gallons of urine passed daily by 1,000 men. Various methods have been adopted or suggested :—

(*a*) *Distant Trenching.*—If solids are to be burnt and urine trenched, it is clear that maintenance of this dual organization must militate against economy. Moreover, cartage of urine alone will lead to dumping of considerable quantities on cantonment outskirts, which could not occur if the carts contained mixed filth.

(*b*) *Surface Irrigation after Heat-Sterilization.*—No suggested device has provided automatic security against the chance of possibly infective urine being run, unsterilized, on to the surface soil of cantonments. Hitherto strong exception has been taken to this method, and especially so in stations deriving their water-supply from shallow wells in or near the lines.

(*c*) *Disposal in Buried Soakage-pits.*—It is suggested that urine from the urinal trough be piped direct through a buried iron lid into an underground pit filled with cinders. This certainly prevents dissemination of urinary organisms by flies and wind, but other aspects require very careful consideration.

On the one hand we know that *B. typhosus* cannot be recovered after the third day from soil contaminated by bacilluric urine; nor, after the fourth day, even from urine containing originally 60,000,000 *B. typhosus* per cubic centimetre.

On the other hand there are these factors: (i) The rains raise the subsoil water into direct communication with all urine pits and all wells in the station; (ii) Percolation can carry the *B. typhosus* through a 15 ft. belt of sand; (iii) *B. typhosus* and its allies are far more motile than *B. coli*, which frequently finds its way into filtered water supplies. Direct flow, percolation and motility may all combine to carry infective organisms from the pits towards the wells. In stations obtaining drinking water from a distant source cutting of the pipes at any time, by accident or by the enemy, would force large bodies of troops to drink water drawn from wells in subsoil levels saturated with percolating urine. He would be a bold man who would recommend this measure for general use while realizing that our knowledge of the transition and involution forms of specific organisms in their saprophytic phase still consists of a few scattered negations.

(*d*) *Evaporation.*—Three chemical firms having declined to make an offer for residual urinary solids obtained by evaporation, it is doubtful if this by-product can be worth anything approaching the sum stated; as, however, it is evident that its inorganic salts alone must possess a very definite manurial value, experiments have been persevered with. This question being the crux of the whole incineration problem, the time spent in briefly summarizing the results of those experiments will not be wasted.

Experiment 1.—The urine of a company (200 pints *per diem*) was all passed into a receptacle containing 90 lb. of sawdust, and having a surface exposed to permit evaporation. During the first four days, the season being the monsoon, the whole of it was evaporated. On the fifth day some effluent appeared, but this was inodorous. In order to delay the appearance of the effluent until the eighth day, and maintain it sterile indefinitely, the sawdust had to be increased to 270 lb. The sawdust at the end of the week contained some 13 per cent of its weight of urinary solids. The salinity of the urine in the upper layers was not, as was hoped would be the case, so great as to arrest fermentation, and great complaints of smell were made. It is clear that flies, offence and cost of material make the adoption of this method impossible.

Experiment 2.—Charcoal was tried next, an improved V-shaped trough being made of layers of charcoal upheld and enclosed by wire netting. The dry season results were: 225 lbs. of charcoal were needed per company; 1 per cent of effluent appeared on the sixth day, being sterile, odourless and so saline as to be anti-bacterial; flies abounded and the ammoniacal smell from the upper layers was much complained of.

Experiment 3.—The apparatus used is diagrammatically shown in fig. 1. A 3 ft. cube frame was enclosed with wire gauze. Urine was conveyed by means of a tap into a shallow gutter in the roof, in which one end of a piece of calico, 60 ft. long by 3 ft. wide was fixed. The urine was sucked up by capillarity and flowed down the length of the calico, which zigzagged down the chamber, turning over horizontal wires at each side alternately. The flow of urine was adjusted by a tap so as to keep the whole of the calico moist. The total evaporating area (on both sides of the calico) was 360 sq. ft., and free access of sun and wind was secured, the folds being edge-on to the prevailing wind.

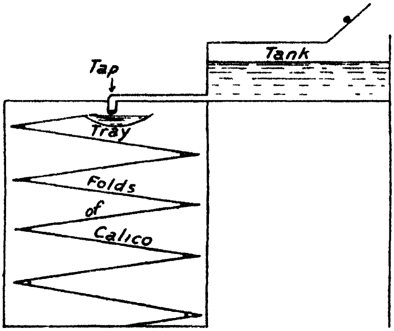


FIG. 1.—Urine Evaporator.

Theoretically the evaporation should be 15 gallons per hour at 85° F.; experimentally it was found to be 10 gallons, owing to lowering of the temperature by evaporation. This would appear to be most satisfactory, but strong complaints were made of ammoniacal smell, and it was found practically that the material sagged, so that urine dripped straight through the centre and the periphery dried up, while the loose stuff threw off a fine spray as it flapped in the wind. The gauze kept flies away, but the spray was carried to a considerable distance, and this was an obvious danger. The little effluent that came through was sterile owing to excessive salinity caused by concentration.

Experiment 4.—Dishes containing 100 grm. of water, with 3 sq. in. of surface, were exposed for an hour in the hot-air sterilizer at a temperature of 80° C. The evaporation amounted to 22·6 grm., which could be increased 25 per cent by adding sawdust, and 37 per cent by adding charcoal to the water. The sawdust sank when saturated. The evaporation of water without the addition of charcoal or sawdust is equivalent to roughly 0·23 gallons per square foot per hour.

Having thus proved that 1 sq. ft. of water gives off 5½ gallons in the twenty-four hours at a temperature of 80° C., it was thought that the temperature of an incinerator furnace should reach 60° C., and at that heat it should induce an evaporation of 3 gallons per square foot of fluid surface per twenty-four hours. This raised hopes that evaporation of urine from trays in incinerator furnaces might be adopted in place of open-air evaporation, which had not been found practicable.

Experiment 5.—Details properly belonging to a subsequent section may here be anticipated in order to follow consecutively the development of this line of investigation. The evaporating tray adopted is shown in fig. 2. It forms a shallow receptacle fitted to form a false roof to the furnace—where the full heat is utilized by convection—and it is then extended to form the floor of the 3 ft. wide flue, where its water surface is exposed freely to the hot air which it was hoped thus to saturate with water-vapour. The furnace is connected with the flue by means of a funnel in the tray. The tray is fed with urine from a tank on the roof by a tap, which is automatically controlled by a ball-valve, so that the tray may neither overflow nor dry up and burn through. Provision is made for the tray to slide out for removal of the urinary solids deposited by evaporation. The following results were obtained :—

(i) With a tray of 9 sq. ft., evaporation never exceeded 2·5 gallons per square foot in the twenty-four hours.

(ii) On increasing the area to 17½ sq. ft. the total amount of fluid evaporated only increased by 3 gallons (from 23 to 26 gallons) in the twenty-four hours, while the rate per square foot per twenty-four hours fell to 1·44 gallons.

Disposal of only 26 gallons certainly did not justify continuance of a device which added considerably to the cost of incineration and, although mechanically successful, was open to legitimate objection as being complicated and liable to get out of order.

(iii) It was further found that the evaporation was reduced to but 2 gallons per twenty-four hours if the fires were damped down by moistening the fuel and thus reducing the combustion rate, i.e., so much of the caloric value of the fuel was absorbed in evaporating the fluid from the saturated litter fuel in the furnace, that little remained when the air reached the urine in the tray; hot air left the furnace nearly saturated with water-vapour. This aspect will be more fully dealt with when we come to consider the physics of incinerators. It is sufficient here to point out that these experiments wholly contra-indicate the use of accessory evaporating devices in incinerator furnaces.

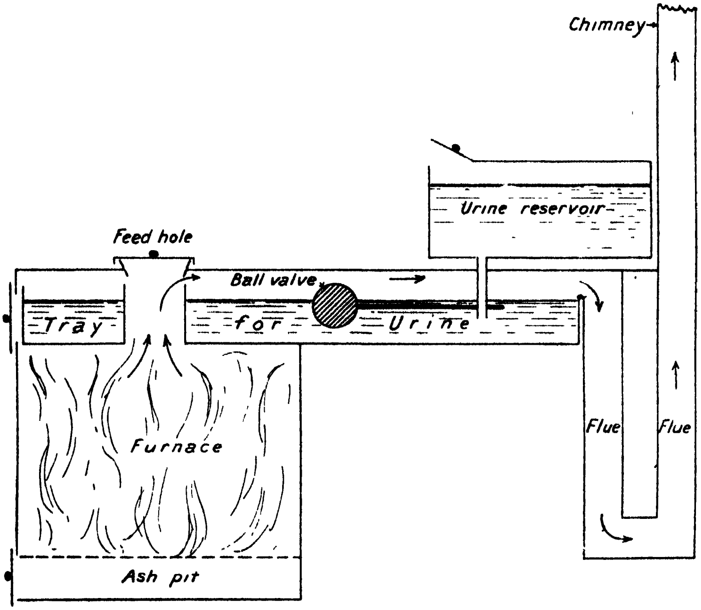


Fig. 2.—Incinerator with urine evaporating tray.

The conclusions drawn from this series of experiments may be thus summarized:—

(i) In the present state of our knowledge it is unjustifiable to dispose of urine by running it unsterilized into the subsoil of cantonments.

(ii) Maintenance of an organization for *separate* trenching of urine beyond cantonment limits is costly and difficult to safeguard.

(iii) Evaporation of urine in the open air cannot be conducted with economy and safety.

(iv) Evaporating trays in incinerator furnaces are complicated and unnecessary, considering that litter is capable of evaporating more than its own weight of liquid, if it be fully saturated before being used as fuel.

(2) *Offence.*

It needs but the whisper of "incineration" to convert the "delightfully familiar odour of burning peat—so reminiscent of the cotter's Saturday night at home," into the "intolerable stench and noxious effluvium from the burning of indescribably objectionable matter." It is some satisfaction to relate that one lady, anxious to launch her protest at the earliest opportunity, was unfortunate enough to apply the latter description with eager haste when a new incinerator was being tried with wood only, as a preliminary to commencing work proper! It is, however, immaterial to consider whether there is any essential difference between the smells of various burning organic matters or whether there is hygienic as well as æsthetic objection to the products of their combustion; unless the objection can be met, public opinion will crush the progress of incineration.

Two main types of incinerators have been designed, the open type and the closed type.

(*a*) *Open Types.*—It is impossible to review this subject without a tribute to the important part played in the evolution of this method by the initiative and energy of the inventor of the "Raitt pattern," to whom we owe a debt for his able demonstration of its general applicability. The value of that pioneer work is in no sense diminished by the fact that open types of incinerator must now be admitted to be unsuited for cantonment use. The best type of open incinerator is probably that adopted at Mhow, and it is sufficient to quote the opinion of the Principal Medical Officer 5th Division on that station, where this type was worked under the personal supervision of the inventor: "The pungent odour from the night-soil incinerators was an intolerable nuisance."

(*b*) *Closed Types.*—These marked a distinct advance, in that combustion was more complete and offensive products were more fully oxidized, becoming simple and innocuous bodies. Such patterns as Haines's, Young's, Hawes's and Cameron's still proved to be objectionable, as is shown by the fact that the chimneys had to be heightened until they discharged some 20 ft. above ground level. Such a type is in use in my own station—a Sialkote with a 20 ft. high chimney—and I have to record that, since writing my first article, I have become aware of a steadily increasing and more influential volume of complaint against this type. The station extends for about two miles in the direction of the prevailing wind, and the leeward end is constantly under a heavy pall of smoke and never free from an acrid smell, which becomes acute on windless days and especially towards nightfall. This will have to be remedied or our incinerators will be closed down. It is fortunate that we have a device which has been proved to deal most effectually with this difficulty and which is as simple as it is effective. If the top of the chimney be splayed out into a chamber, which is plugged with a bundle of dried litter, the retarded current of air deposits the greater part of its smoke and some condensed steam upon this litter filter. In addition, there is a heavy deposit of tarry material, to which carbon particles adhere. The resulting extensive surface of water and carbon absorbs a large proportion of the foul gases evolved during combustion, as well as entangling the soot. The more the chimney is splayed out, and the greater the resultant retardation of the current through it, the more completely will the deposition and absorption be effected.

One such incinerator has been in action for two years within 30 yards of a barrack-room, without any complaint being made by, or elicited from, the men. One officer, admittedly opposed to cantonment incineration, was taken directly up the wind towards this installation and failed to detect its presence until within 50 yards or so, although it was then working at its usual pressure and the chimney was but 12 ft. high.

It is probable, however, that the offence complained of is caused less by the escape from the chimney than by that which results from the constant opening—and leaving open—of the lid by the sweeper when stoking and feeding the furnace. It is obviously preferable to empty each *gumlah* as soon as used rather than to adopt the objectionable alternative of storage in *balties;* the tendency of the sweeper to leave the lid open must be checked. This has been done by fitting the lid with a water-sealed rim and hinging it with a counter-balancing weight and a flange, so that it is opened by the foot of the sweeper to only a certain angle and slowly closes of its own weight as soon as his foot is removed from the lever. Dusting of *gumlahs* with lime is found to be most effective as a means of keeping flies away, and the covering of dejecta with a layer of ash prevents offence while the *gumlah* is being carried from the latrine to the incinerator.

(3) *Fuel.*

This most important consideration controls not only the cost but the practicability of this method of conservancy. It will be best approached by the tabulation of certain essential data.

(*a*) ***Amounts of Excreta, &c., to be Consumed.***—

OZ. PER HEAD IN TWENTY-FOUR HOURS.

	British troops	Native troops	Bazaar population
Fæcal solids	1	1½	1½
Fluid in fæces	3	6½	6½
Urine passed with fæces	5	5	5
Antiseptic fluid in *gumlahs*	10	—	—
Washing water	—	10	10
Urine collected separately	45	30	10
Ounces total fluid	63	51½	31½

GALS. PER 1,000 STRENGTH IN TWENTY-FOUR HOURS.

	British troops	Native troops	Bazaar population
Gumlah contents, without antiseptic	50	72	72
,, ,, with antiseptic*	112	—	—
Total, without *gumlah* antiseptic	331	322	199
,, with ,, ,,	394	—	—

Notes.

(i) Europeans pass daily fæces 4 oz., of which 75 per cent is water (3 oz.). Natives pass daily fæces 8 oz., of which 80 per cent is water (6½ oz.).

(ii) It is difficult to get natives to use urinals. The 30 oz. given above represents probably considerably more than the average per head collected daily from native units. The amount collected from bazaars was twice measured, it was respectively 7 per cent and 16 per cent of the total calculated to have been passed. This will cause no surprise to those conversant with native habits.

(iii) It is probable that lime is as effective as liq. cresyl. in keeping flies away from latrines; this is very important, as present regulations result in the addition of a considerable bulk of fluid to that which has to be disposed of.

(*b*) ***Amounts of Fuel Available.***—(*i*) A cavalry regiment receives 2,400 lb. of bedding grass *per diem*, of which it is estimated that one half is eaten or stolen, thus leaving 1,200 lb. available. To this must be added the droppings, at 12 lb. per animal *per diem*, i.e., 4,800 lb., or a total of 6,000 lb. a day. Actual measurements for a month showed that 415 cubic ft. were collected on an average a day, which, at 15 lb. per cubic ft., gives 6,225 lb. a day.

(*ii*) I have no idea of the amount of sweepings available from dismounted units. Such rubbish is valued at one anna per cart, which, at 10 lb. per cubic ft. and 40 cubic ft. per cart, amounts to 400 lb., or say 300 lb.

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* Not used in native latrines.

(*iii*) A practically unlimited supply of grass is available; at grass-farm rates this costs 5 annas per 100 lb.

(*c*) *Amounts of Fuel Required.*—As fæcal solids provide for their own combustion, the matter is much simplified by the preceding table, which reduces the whole problem to the evaporation of so much fluid for each class.

All available data have been carefully collected. It is regretted that they are incomplete in most instances, but striking of averages for all comparable conditions has enabled many gaps to be filled. From the mass of results thus digested, there has been worked out the one essential datum, which is that showing how many pounds of fluid have been evaporated per pound of fuel expended.

(i) OPEN PATTERNS.

		Lb. fluid per 1 lb. fuel.	
Station	Type	During monsoon	Dry season
Average of six	Raitt	Impracticable	0·80
Average of five	Hunt	0·25	0·95
	(ii) CLOSED PATTERNS.		
Dehra	Young	—	0·75
Wellington	Wellington	-	0·72
Ambala	Ambala "B"	—	0·80
Landour	Landour (model)	—	1·00
Meerut	Lancer	1·23	1·34

Notes.—(i) The Lancer pattern referred to above is one in which there is a urine evaporating tray in the furnace. These observations are now two years old. They were most carefully made daily from June 8 to November 20, and included exact weighings of fuel and measurements of fluid disposed of, through the monsoon and on into the dry season. The results obtained are so much better than those resulting from the use of other types that the following experiment was conducted to serve both as a control and to afford a comparison between the maximum evaporation from tray and furnace combined and that from the furnace only. Of the 1·23 lb. of fluid per 1 lb. fuel, 0·3 was evaporated from the tray and 0·93 from the furnace.

Experiment.—A foot-cube model was made of iron, of the type which will be described as our latest modification. It is evident that this small model could not be expected to give as good results as the incinerator itself, but the fuel and fluid were most carefully measured, and it was proved by five trials that the model would easily deal with 1 lb. of liquid per 1 lb. of fuel consumed. Although there was no cause to doubt the accuracy of the Lancer pattern results—taken by three men over so long a period—it was satisfactory to have the added assurance of experiments conducted in the laboratory, and it was also satisfactory to find that the furnace alone was capable, even in this small model, of dealing with 82 per cent as much liquid as from tray and furnace combined.

(ii) Careful scrutiny of the figures will detect disparity between the ratio given and the claims advanced on behalf of the open types. This is explained by the recorded measurements of the amount of urine actually collected in bazaars, where these installations have mostly been used. Measurements have not been given, but it has been broadly stated that incinerators of certain dimensions have disposed of the total solid and fluid excreta of so many persons. The report has been quite true, but the urine collected and thus disposed of has, as shown, amounted to but a fraction of that passed, e.g., it is stated that a 7 ft. diameter Raitt will deal with the total excreta of 750 persons—i.e., 250 gallons, or 7 gallons per square foot. Experimentally it was found, however, that the maximum charge of fluid per square foot of surface, which did not drip right through within a couple of minutes, was 0·5 gallon, so that it would be necessary to have urine sprinkled on it at least fifteen times in the twenty-four hours, which could not be done, as the sweepers work only twelve hours a day.

We are now in a position, with the foregoing data, to state the actual fuel requirements as follows :—

LB. OF LITTER OR GRASS FUEL REQUIRED PER 1,000 STRENGTH PER DAY.

	British troops	Native troops	Bazaar population
Gumlah contents, without antiseptic ..	400 ..	574 ..	574
,, ,, with ,, ..	896 ..	— ..	—
Total, without *gumlah* antiseptic ..	2,648 ..	2,560 ..	1,592
,, with ,, ,, ..	3,152 ..	— ..	—

For natives this provides for a considerable margin over the amount of fluid actually collected.

The factor used in this calculation is 1·23, viz., the amount of fluid evaporated by 1 lb. of fuel at Meerut during the monsoon. That this figure does not represent the possible maximum is shown by the fact that on July 18 the fluid evaporated per 1 lb. of fuel was 1·6, while on August 10 it rose to 1·7, but it should be noted that on those dates facilities were afforded for rough-drying the litter beneath an open shed.

It will further be noted that there is much less difference than would have been expected between the results obtained during the dry and wet seasons; this is probably accounted for by the fact that the relatively high temperatures at which this experimental incineration was conducted made the humidity of the external atmosphere of comparatively little consequence.

Conclusions.—(i) The total fluid and solid excreta can be disposed of by incineration with 2¼ lb. of fuel per head per day.

(ii) Using this quantity of fuel, the litter of one cavalry regiment will dispose of the total excreta of 2,000 men.

(4) *Flies.*

With regard to flies, we wish to prevent their gaining access to human dejecta, and, as an extra precaution, to reduce their numbers.

All modern latrines now have an enclosed space for the receptacle, which is supposed to be fly-proof. Actually it seldom is so, and hence the following routine has been adopted: *Gumlahs* have a thick layer of ash placed in them, on which is dusted some lime; immediately after use it is the duty of the sweeper to cover the dejecta with ash and empty it forthwith into the furnace. The ash is sufficient to absorb all the dejecta, and the whole contents fall out in one mass, leaving the *gumlah* quite clean and dry so that it has no attraction for flies. Practically it is found that, although some flies may gather about the incinerator, attracted by its moisture, there are very few in latrines in which this routine is properly carried out.

The prevention of fly-breeding in litter is more difficult, but is surmountable with a little care, although the difficulties are enhanced in the rains when the litter must undergo some preliminary drying. All litter should be carried daily to the drying-shed beside the incinerator. This shed consists of a metal roof with fly-proof gauze sides and iron bars about a foot above the concrete floor. It has a feed-hole at the top of one end and a rake-hole at the floor level of the other end; both holes are protected by fly-proof doors closing by gravity. The litter is thus passed through the chamber, which should not be of a capacity of more than two days' supply. Some provision must be made for removal of the drainage which drips through the bars on to the floor; this is necessary not only on account of flies, but also to prevent it affording breeding grounds for mosquito larvæ. This is secured by raising the floor somewhat and giving it a slope, so that shallow runnels lead the water to a pipe opening into a properly lidded receptacle which should be emptied daily.

(5) *Types.*

We now come to the most interesting part of this complex problem—the consideration of various types of incinerator. It is hoped that none of the many details hitherto dealt with has been irrelevant, and their consideration has, incidentally, disposed of many preliminaries to a review of the numerous types which have been described.

(*a*) *Open Types.*—It has already been shown that these types are not suitable for cantonment use owing to the offence to which they give rise. It has also been shown that they will not deal with the amount of fluid which it is essential to dispose of. It may be here pointed out also that they will not work in the rains unless covered, while they are sources of very considerable danger of dissemination of infective material by wind unless they are also enclosed by wind-screens. If they must be roofed and enclosed it is clear that they approximate to the closed type; but they cost more than the latter, while their combustion is less under control. In short, for use in British lines they are obsolete and discredited.

(*b*) *Closed Types.*—(i) Primitive patterns. These—of which Hawes's was the pioneer and the Sialkote is the modern representative—consist merely of a furnace in which the mixed fuel and excreta are burnt together and the fumes are led off by a chimney. The creation of a nuisance has not been obviated by the heightening of the chimney, although that now discharges 20 ft. above the ground level (*vide supra*). Various attempts have been made to destroy these fumes, and the suggested devices may be divided into two groups, according as the dejecta are burnt with, or in a separate chamber from, the fuel.

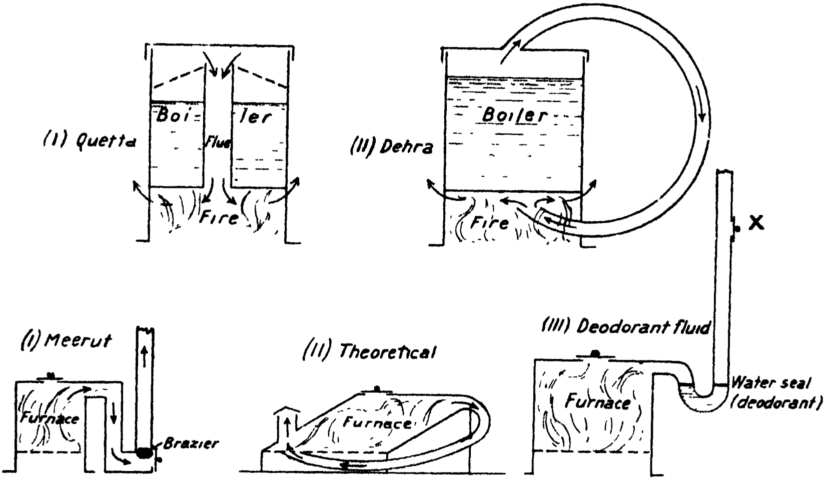
(1) *Dejecta in a Separate Boiler.*—*Thompson's* (*Quetta*) : This is shown in fig. 3 (a) (i). The fumes pass from the boiler down a central pipe and so escape through the fire, which is supposed to oxidize them. At first it was found that the contents frothed over and put the fire out. This was prevented by the addition of a perforated diaphragm (shown dotted), which broke up the froth and allowed the fluid to run down its upper surface into the boiler again. It was found that it took over twenty-four hours to burn out and was costly in fuel.

Dehra Dun, shown in fig. 3 (a) (ii): This is somewhat similar, and it "took sixteen hours to incinerate, with excessive fuel consumption." It is evident that the combustion of excreta and fuel in separate chambers must involve enormous waste of the latter, and this idea was therefore not pursued further.

(2) *Dejecta and Fuel Mixed.*—Attempts were made to pass the fumes through a secondary fire, through a part of the main fire, through a deodorant fluid, and through litter used as a filter.

Meerut.—The flue was taken down to ground level, where it was splayed out to permit of deposit of heavy soot particles. The flue then narrowed to the chimney foot, where a small brazier of charcoal was inserted. It was hoped that the amount of carbon monoxide present would prevent rapid combustion of the charcoal and maintain it economically at a dull red heat, which would destroy the fumes passing through. Also, by thus heating the air in the chimney, it was hoped to secure extra forced draught through the furnace. Practically this device served its purpose, but it burnt out in a few minutes and proved too costly for use. It is shown in fig. 3 (b) (i).

(*a*) With a separate boiler for fluids.



(*b*) Fuel and dejecta mixed in the furnace.

FIG. 3.

Theoretical.—Shown in fig. 3 (b) (ii). It was proposed to set the furnace at an angle, so that the red-hot layer would slide down into one corner. The fumes were to be brought by a pipe which discharged beneath that corner, so that they passed up through it, to escape by a small chimney immediately above. This escape chimney being below the main body of the fire, it was thought that no fumes would escape directly by that route. Unfortunately there were no means of preventing chokage of the end of the pipe by ashes falling directly into its mouth; moreover, there would obviously be great difficulty in establishing and maintaining a through draught, therefore the idea was abandoned as impracticable. At this time it was realized that, if any such simple device were feasible, it would long since have been taken advantage of for commercial purposes, and not left to would-be devisers of incinerators to evolve.

Deodorant Fluid.—The next suggestion was that the escaping products of combustion should be bubbled through a deodorant fluid—an excellent idea if it could be carried out. It could be done if the excreta were consumed in a boiler separate from the fuel, but this procedure has already been shown to be too costly in fuel. From experience of the ordinary "hubble-bubble," it is apparent that, to be effective, the gases must be passed through a considerable depth of liquid. The difficulties will be apparent from a glance at fig. 3 (b) (iii). First, it is obvious that it will require some force to take the fumes through the deodorant fluid in the U-shaped bend, and it is further equally obvious that, if the furnace were got going, and the U-shaped bend then filled, the expanding air in the furnace would take the route of less resistance and blow back through the firebars rather than ascend the chimney. It would therefore be necessary to secure a suction effect by a secondary fire near the top of the chimney—as indicated at "X"—which would involve all the expense indicated under that proposal initially. Further, some device would have to be adopted by which the supply of fluid in the bend would be renewed automatically; and there is the great objection that the sweeper would have to be responsible that the fluid was renewed when the deodorant was exhausted; while, finally, as an additional complication, the supply of deodorant would have to be maintained.

Litter Filter.—This has already been discussed. The design is shown in fig. 4. It has the advantages of being so simple as to be within the scope of even the sweeper's intelligence, of requiring only material always at hand, of costing nothing, and being renewable in a few seconds, of being itself combustible, owing to the condensation of the products of partial combustion in its interstices, and, finally, of being of proved efficiency. It can be inserted at any point in the ascending flue, the only essentials being that the sides of the chimney beyond it should be air-tight, and that the door through which it is inserted should fit so closely as to prevent short-circuiting of the forced draught produced by ascent of heated air through the chimney. Its efficiency becomes greater as the tarry deposit increases, it is advisable that two such filters should be used in the circuit, to be renewed alternately on alternate days, or as may be found necessary.

Patterns Fitted with Devices for Aiding Evaporation.

In the simplest of these designs a receptacle from which urine was evaporated was placed in the furnace. The smell of urine increased the offence considerably without an adequate return, for it is clear that a tank affords so little surface in proportion to bulk as to make the amount of urine thus disposed of inconsiderable. In other patterns the urine, after it had been supposed to be boiled, was drawn off by a tap, and thrown on the surface soil. The decision as to whether the urine were sterile or not was left to the discretion of the sweeper!

Next came the era of trays, of which the Wellington and Meerut were the pioneers. That at Meerut has been described—it has the advantage that urine is evaporated completely, while the exposure of the large area of 17½ sq. ft. for 6 in. of depth enabled 26 gallons to be disposed of in the twenty-four hours. Difficulty arose, however, from the need of some automatic device to prevent the tray being overfilled, thus flooding the fire. For the first time this installation enabled the whole excreta, fluid and solid, of a unit to be disposed of with a moderate consumption of fuel.

This was followed by a most ingenious invention at Ambala. There the urine was placed in cylinders in the furnace. The cylinders had a number of small perforations in the base, which were covered with a layer of 1½ in. of wood ash. When the urine boiled, the ebullition allowed the urine to drip through the ash on to secondary evaporation trays placed beneath. There are, however, two very strong criticisms to be offered to this installation: (*a*) It is clear that, if the urine is to be boiled in these cylinders, there must be fierce combustion in the furnace, and a large proportion of the caloric value of the fuel must be wasted as the heat passes the cylinders to the chimney. This is evidenced by the fact that the fuel required in this pattern is 60 per cent greater than that of the Lancer pattern. It would appear that this ingenious idea might be turned to better advantage if it were applied to a shallow tray of large area, so as to secure a uniform distribution of urine upon the mass of litter in the body of the furnace. It is a mistake to suppose that leading the fumes from the cylinders into the chimney has disposed of the offence which is inseparable from the evaporation of urine. A certain amount will doubtless be absorbed by the soot in the chimney, but that will be but a small fraction of the whole. Without some means of dealing with the nuisance, this installation is just as offensive as the Sialkote type, and it has been shown that strenuous objections are being made to the latter.

Suggested pattern for Landour. It is advisable to pause here and, in the light of the practical experience gained, consider the physics of the means whereby we hope to attain our triple aim, of (*a*) maximum evaporation, (β) minimum offence, and (γ) minimum fuel expense.

The caloric value of the fuel consumed in incineration is expended on:—

(1) Evaporation of fluid.

(2) Maintenance of the draught necessary for continued combustion.

(3) Loss through the chimney of heat in excess of that needed for draught.

(4) Loss of heat by radiation, &c., from the exterior.

Now (4) is probably a constant, whatever our rate of combustion, and not worth the cost of prevention by building a fuel chamber around the furnace. (3) should be capable of reduction to small dimensions by practical application of sound principles. (2) is a matter of friction and is intimately concerned with the removal of nuisance caused by the smoke and fumes. If this can be assured, the extra expense of fuel incurred thereby is well spent. (1) is the most important hygienic consideration, as upon it depends our ability to dispose safely of urine.

To return to our aims—

(*a*) *Maximum evaporation.*—The ideal method is that which secures an intimate admixture of excreta with a "matrix" fuel, which provides the fluid with an enormous evaporating surface in proportion to its bulk, forms a spongy mass, through the interstices of which hot air percolates until saturated with water vapour, and automatically ensures that the fuel cannot burn until its charge of moisture has been evaporated. If the liquid be separated from the fuel by enclosure in a boiler, the furnace heat only transmits a part of its value to the boiler contents, while the remainder roars to waste up the chimney. The importance of this point is evidenced by the fact that, as shown, the matrix-fuel method requires but 62 per cent of the fuel needed by the alternative boiler method.

It was hoped to ascertain, by the model referred to, whether slow or rapid combustion gave the better result—the rate of combustion being controlled by differential temperature readings from thermometers in the furnace interior and in the external air. The records have unfortunately been lost, but it is highly probable that slow combustion is the better, and, if so, this affords an additional argument in favour of the matrix-fuel method, which works continuously throughout the twenty-four hours.

(*β*) *Minimum of Offence.*—This raises some interesting points for consideration. The only practicable and effective means evolved so far is that of the litter filter, the efficiency of which depends upon its extent of surface, the moisture of that surface, the retardation of the current through it, and the filter being left long enough to be coated with a carbonaceous tarry deposit. Extra fuel must be used to overcome the additional friction thus thrown into the circuit, though this may be lessened by heightening the chimney.

It is found experimentally that, if the caloric value of the fuel be utilized to within 5 per cent of saturation point by water vapour, the remaining energy is sufficient to afford the necessary balance for meeting friction and loss. At that point water is progressively deposited in the litter filter if that be placed in an external chimney. It is obvious that the litter filter must be placed in the ascending chimney so that the ascent of the hot air on the distal side of the filter secures aspiration and forced draught sufficient to maintain combustion. The objection to this is that a certain amount of water condenses continuously and either has to be evaporated afresh or else causes nuisance by soaking through the chimney and running on to the ground. Also the cooling of the hot air in the interior of the chimney throws extra work on the furnace, and might just be sufficient to determine the equilibrium point at which the fire would be put out if it were too much damped down at night.

It is proposed to meet both these difficulties by taking the flue through the heart of the furnace, before it turns to ascend through a fuel drying chamber on the furnace roof. The litter filter would then be inserted in a box on the portion of the flue inside the furnace, the box having an iron door in the furnace wall. By this means water would condense at once on the filter, but, once deposited, would be maintained at that amount by the balancing forces of condensation and evaporation—with the cooling action of radiation from the door just turning the balance. Moreover, the temperature inside the flue would adjust itself to that of the furnace and energy would thus be economized, with a consequent lessening of any tendency for the fire to go out. It is probable that this is not actually necessary, for the Lancer pattern described worked night and day for twelve months, during which time it only went out accidentally twice.

(γ) *Minimum Fuel Expense.*—This has been sufficiently discussed under the two preceding headings.

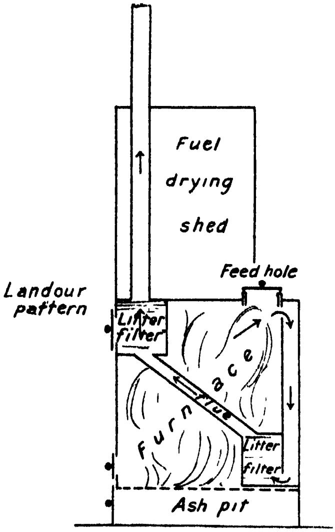


FIG. 4.

Conclusions.—(i) That the admixture of excreta with matrix fuel and combustion in a furnace affords the maximum evaporation of which the caloric value of the fuel is capable.

(ii) That this simple method obviates the necessity for any accessory means to evaporate fluids.

(iii) That offence can be obviated to a large extent by the use of litter filters at a small increase to fuel expense.

(iv) That such litter filters are best situated in a portion of the flue taken through the furnace for that purpose and for the more certain maintenance of combustion.

It only remains to remark that the drawing of this type, now in course of erection, appears in fig. 4 and that its soundness of principle has been thoroughly demonstrated by experiment with a 1 ft. cube iron model, which has disposed of 1·25 lb. of water for each 1 lb. of fuel consumed, and when once heated, burns quite steadily without extra forced draught.

(*B*) COST OF CONSERVANCY IF INCINERATION IS ADOPTED.

This section, fortunately, can be dismissed in a few words. It has to be considered from two standpoints, according as the value of the litter to the grass-farm authorities is, or is not, taken into account.

(1) *Not considering the value of litter to the grass-farm.*—It has been estimated that, at Meerut, the cost of conservancy to one British cavalry regiment has been Rs. 373 per 1,000 strength per annum less since incineration was adopted.

At Dehra Dun it has been calculated that the cost per annum per 1,000 strength of native infantry has been reduced by Rs. 216 per annum.

At Ambala it is stated that the comparative costs are "about the same" for the conservancy of British troops by the two methods.

At Meerut it is estimated that the establishment of forty-seven incinerators in cantonments has resulted in an economy of Rs. 4,000 per annum, the population being approximately 12,000, this amounts to a saving of Rs. 350 per 1,000 strength per annum.

These illustrations suffice to show that incineration enables a definite economy to be effected.

(2) *If the value of the litter to the grass-farm be considered.*—It has been seen that the litter from one British cavalry regiment amounts to 6,000 lb. per diem. The grass-farm authorities claim that this litter enables them to surface-trench six acres per annum, with an increase in the grass crop from 100 to 600 maunds per annum for eight years. Before this estimate can be accepted, information is required showing how much of this increased crop is due to turning over the soil, and how much to the manurial value of the litter. Until that information is forthcoming it is impossible to say what the net cost of incineration really is.

(*C*) EFFECT OF ADOPTION OF INCINERATION UPON MILITARY EFFICIENCY.

With so many improvements in the hygienic conditions of the troops in India, and marked advances in the art of preventive medicine, it is impossible to allot to any one measure its share of credit for the remarkable diminution of sickness amongst the troops in India which has characterized the last few years. It is, however, significant to note the unanimity with which those most directly in touch with the advances and shortcomings of Indian sanitation—the divisional sanitary officers—attribute, in their annual reports, a large share in the diminution of sickness in their respective divisions to the more general adoption of incineration as a means of disposing of dejecta. It may well be that only on general principles are we entitled to that belief, but none the less is that belief in its turn entitled to credence if based on the application to conservancy methods of definite knowledge of specific disease acquired by the accumulated experience of many years of patient research. This much at least is certain—the sanitation of native units more especially has left, and still leaves, much to be desired, and the attention that has been drawn to sanitary conditions (or perhaps one should rather say to *insanitary* conditions) by the introduction of incineration has already had a most beneficial effect in its educational influence upon the attitude towards sanitary matters adopted by both officers and men.

THE MANUALS OF PHYSICAL TRAINING IN GERMANY, AUSTRIA AND GREAT BRITAIN.

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This paper is the fruit of the suggestion made to me some time ago by Lieutenant-Colonel Melville that a comparison of the methods of physical training in use in the armies of various countries might be of interest. While I may claim a fair personal knowledge of the British system, my knowledge of the others is derived from a perusal of their manuals only. I have, however, made use of my position at the Curragh to supplement this to a certain extent by getting some of the exercises, which appeared to me to be of special interest, carried out practically by squads in their last week of training. This applies especially to "free" exercises and to parts of the obstacle training.

The German Manual.

This is in its spirit perhaps furthest removed from our own. It savours more of the drill hall than of the open field and its exercises show neither the practical application of the Austrian nor the reasoned analysis of our own.

It may be of interest to advert first to the system of training. It is purely regimental. On first joining the recruit is put through a few preliminary exercises and then when out of the recruit stage he joins the lowest class formed from the trained soldiers. In this he will remain until in the judgment of his Company officer he is fit to be promoted to a higher one and so on. It will be seen that the training is progressive during the whole of a man's service instead of being as with us practically concluded during the first six months. The difference is probably due to the different conditions of service. The German recruit usually joins at 20, and is more or less a made man and able to bear the fatigues incidental to military life. With the British soldier of 18 the first consideration is to make him "fit," and there is no good putting much work on him until he is.

The book is divided into five sections: (1) Free gymnastics; (2) exercises with rifles; (3) exercises with apparatus; (4) applied gymnastics; (5) description of apparatus.

Of the free exercises the manual says that they loosen the joints, widen the chest, teach a man how to hold himself and produce co-ordination, and should be practised throughout the course.

After this one would expect to find the movements both varied and excellent. They are neither. The majority are common to all manuals; this is not in itself a fault, but the methods taught appear to me distinctly inferior to those found elsewhere. For instance take No. 20 "arms bend." Instead of the arms being brought well back they are kept pressed close in to the sides and the forearms are brought straight up in front of the upper arms. One need only try the two positions to feel how the one opens out the chest, the other cramps it. Take also the method (No 83) of balancing on a beam taught in the German Army. The arms are flexed to a right angle at the elbow, the wrists dropped, and the knees also flexed. Our own seems infinitely preferable. There are, however, three exercises in this part of the book which in our own appear wanting. These are Nos. 22, 28 and 31. In the first the arms are extended sideways and then slowly rotated at the shoulder joint. The second is "leg raising forwards and sideways" but with a kick instead of slowly. The third is "knee raising and rotating the foot at the ankle joint."

Of the next two sections "exercises with rifles," and "exercises with apparatus," I need say little. The former are in our Army largely practised during musketry training, the latter are simply all the old exercises at parallel and horizontal bars with which we were familiar in pre-Swedish days.

Then follows "applied gymnastics," which with a description of the various gymnastic apparatus concludes the book. The course of applied gymnastics consists in training men to surmount the usual obstacles and contains nothing noteworthy. What is, however, I think of importance is that it is distinctly laid down that all the exercises in this section should be done not only in gymnastic kit but with gradually increasing loads, until the soldier carries his full war equipment. This appears a most important point and one to which I shall revert later.

THE AUSTRIAN MANUAL.

The methods in use in the Austrian Army may perhaps be described as intermediate between those in use in the German and the British. While its apparatus is still that of the old school it includes in its "free" exercises many which are characteristically its own, and most of which are, I think, distinctly valuable. Its methods of obstacle training also are distinctly superior to those of the German School, and some might to my mind be adopted with advantage in our own Army.

The preface contains a noteworthy summary of the practical character of the book. "The object of physical training is to teach men to pass such obstacles as they may meet in the field, and to enable them to do this with ease, in good order, and without undue expenditure of time and energy." The idea of physical training for the soldier could not be put more concisely, or in plainer words. One other remark I must quote from the preface. After explaining how an instructor should demonstrate a new exercise it goes on to say, "and then each member of the squad will go through the exercise separately until he knows it, and only then will several men be allowed to do it at once." It is evident that the Austrians also have suffered from that trouble which so persistently affects us, of instructors keeping a whole class in a constrained position while they are correcting one man. They have taken radical means to stop it. I am not certain whether we shall not be driven to similar measures. The loss of time is probably more apparent than real, as careful preliminary explanation saves many corrections afterwards.

The manual itself is divided into five sections: (1) Free gymnastics; (2) exercises with apparatus; (3) applied gymnastics; (4) bayonet fighting; (5) swimming; of these the two last are peculiar to it.

That swimming is not taught in our Army is, I think, to be regretted. Physically it is, I suppose, one of the finest exercises known, its utility is undoubted, and its cleansing value not to be disregarded. Personally I should like to see a swimming-bath attached to every gymnasium, but that is, I suppose, a counsel of perfection and not likely to be realized. Still it might be done at some of the larger ones (with shower baths at the smaller ones) and wherever possible I think swimming should be officially taught to the soldier.

Bayonet fighting is of course taught elsewhere in the British Army, and is a subject on which I am not qualified to speak. The same holds good for the "rifle exercises."

Of the "free" exercises I will only mention those which are not found in our own or in the German manual. Of these the first is "grätschen"—i.e., separating your legs as far as possible with a spring, and then bringing them together with another spring. It does not appear to be specially valuable. The next one "anfersen" —trying to kick one's own buttock—is a powerful exercise for the hamstrings. Distinctly good is No. 28, which consists in swinging the lower limb from the hip joint forwards, inwards, backwards, and outwards, keeping the knee stiff. The British manual has the same exercise done in sections, raising the leg alternately forwards, sideways and backwards, but the Austrian complete circle is much more powerful, and I think a decided improvement. The only other exercise I need mention is No. 35, which is circling the arms with closed fists from above the head downwards, backwards, and upwards, and which appears valuable. The "free" exercises are concluded by a series of "combined" movements, the details of which are apparently left to instructors, a few examples only being given as guides. This method of leaving a certain amount to the initiative of the instructors appears on the whole good. It must develop in them an intelligent appreciation of their work, and for the men avoid the monotony which is apt to be marked in the senior classes. But this method also requires some safeguards. While the instructor should be encouraged to think out new exercises he should also be required to submit them for approval to the medical officer and superintendent of the gymnasium before executing them.

The exercises with apparatus are simply those of the old physical drill and call for no comment. They include, however, "pole jumping," which I think it is a pity we do not practise.

Of the applied gymnastics there are several which are worthy of note. They seemed so good that I tried them practically with a class and confirmed my previous opinion. The first is "passing on the beam." Two men on the beam meet each other coming from opposite directions. The first lies down across the beam, legs one side, trunk and arms the other. The second man simply steps over him and both continue on their way. The exercise is simple and practical, but requires a little practice. The next is "getting over a six-foot wall without assistance." Lean your rifle against the wall, pull yourself up and get astride the wall. Then hook the knee into the top of the wall, lean down until you can grasp the rifle, sit up and drop down the far side. Next "getting over a ten-foot wall with assistance." Three men run forward and place their rifles against the wall. The centre man is grasped just above the ankles by the other two and raised until he can grasp the top of the wall and pull himself up. He gets astride the wall. Of the remaining two one man kneels down, the other gets on his shoulders, the kneeling man rises up and thus lifts his companion level with the top of the wall. He gets astride facing the first man.

Rifles are passed up and the third man grasping one held by each of his companions also reaches the top. Finally, "getting over a fifteen-foot wall," six men form a pyramid and thus get one of their number to the top. A rope is thrown up to him and while the rope is held this side he shins down the far side. Then he holds the rope on the far side while the next man gets up it on this side, and a continual procession thus results, the man going down balancing the man going up. Finally the rope is used to pass over any packs which may have been taken off, and the last man either drops down the far side, or is assisted down by renewed formation of the pyramid.

In concluding my remarks on the Austrian manual I may say that it is characterized by excellent illustrations superior both to the German and our own.

THE BRITISH MANUAL.

The principles governing this manual have in a previous number of this Journal[1] been so excellently described by Lieutenant A. S. Amy, and are now so well known that there is little need for me to do more than to emphasize the differences between it and the two we have just considered, and to point out a direction in which it might possibly be amplified.

The first difference is one of internal arrangement. While hitherto we have seen manuals basing their classification on the question whether the exercises are being done with apparatus or without, the British manual is arranged on a purely anatomical basis. Arm exercises follow leg, dorsal follow abdominal, and so on. The difference is a fundamental one. It shows for the first time an attempt to classify an exercise not as a mere *tour de force* or feat of agility, but to dissect it into its component parts, and to realize definitely what muscles are affected by it and what untouched. This is a great advance on previous ideas. From it must follow that for a harmonious development of the human body a series of exercises is necessary, each bearing its share and filling up the gaps left by the previous ones until the whole frame has received its share of attention. And so in fact we find it. A series of tables has been arranged, each containing its due proportion of exercises, so that when completed the body will as a whole have made a step forward on the road of development.

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[1] THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. x, p. 474.

The value of the tables is not exhausted by this. The alternation of exercises is such that as far as possible the same muscles do not come into play in two successive groups and feats of strength and feats of agility mutually relieve each other. Finally, the definite place allotted to introductory and final exercises mark the recognition of the physiological need of gradually working up to a pitch and also gradually coming down from it.

Yet with all these excellencies one may find some defects. The first is a trivial one. I would like to see the somewhat meaningless words "span bending" replaced by what I gather it is meant to represent, "spine bending." Other possible improvements have already been alluded to; instruction in swimming whenever possible, and while keeping the general framework unaltered, some latitude to instructors to exercise their ingenuity in the invention of exercises.

More radical are the following suggestions I would make. The whole object of the "obstacle training" is presumably to enable a man to surmount these obstacles in war. To enable him to do so he should be trained in peace with the same load that he carries in war, but our gymnastic course takes him no further than doing it in gymnastic kit. It may be said that if the method is taught that will suffice. I do not think so. I took some squads which had completed their course of training and could go over the obstacle course with ease and put them over the same course in full marching order. It was almost ludicrous to see them boggle over low jumps and vaults and fail to surmount walls which in gymnasium kit they got over with the greatest ease. I then took some other squads and trained them over the course gradually, first in boots and coats, then with packs and gradually with full war loads. At the end of the week they got over the course when fully loaded as well as they did beforehand in gymnastic kit. But it was evident that training in this as in all other things was necessary. I should like to see added to the list a fourteenth table, giving this training and including also running for short distances when fully loaded.

This brings me to my last point. Running is at present done under regimental arrangements. I am somewhat doubtful whether this is the best possible arrangement. I have several times found men with doubtful hearts whom I had carefully shielded from all ill in the gymnasium being taken out for long runs regimentally with the result that their improvement was not as rapid as I had hoped. Running, properly taken, is, I suppose, as good an exercise as you can get for the lungs and the heart: improperly taken it will probably do more harm than the book of physical exercises. And yet it is the one exercise at which a medical officer is not present to watch the recruit when he comes in, and it is the one exercise at which a recruit from a spirit of emulation is most likely to overstrain himself. Both Germans and Austrians include running in their curriculum at the gymnasium. It would, I think, be an advantage if we did the same.

AUTHORITIES.

[1] *Turnvorschrift für die Infanterie*, October 24, 1895. Berlin, 1895. Ernst Siegfried Mittler und Sohn.

[2] *Turnvorschrift für die k und k. Fusstruppen*, Wien, 1903.

[3] "Manual of Physical Training," 1908.

NOTE BY LIEUT.-COLONEL C. H. MELVILLE, R.A.M.C.

Since the above paper was written a new issue of the German *Turnvorschrift für die Infanterie* has appeared, and I have therefore thought it advisable to add a short appendix to Captain Balck's paper pointing out the principal changes. These indicate to a certain extent the change of feeling in respect to physical training in the German Army, and possess therefore a distinct value.

The classification of exercises is slightly different and now runs as follows: (1) Free exercises and exercises with rifles; (2) exercises with apparatus; (3) exercises in applied gymnastics; (4) running and games. This last is a completely new section.

In the introductory remarks a new recommendation is made referring to the early introduction of applied gymnastics, and games, in the recruits' course. The following, which is also new, seems worthy of note. "Sprinting and long distance running should be frequently practised with a view to improving the wind." Instead of the old division of the trained soldiers into three classes, the recruits being kept separate, all men including recruits are now formed into two classes only. The promotion of a man from the lower to the upper class rests with the company commander. A suggestive new paragraph is inserted towards the end of these preliminary remarks pointing out that the effects of a good system of physical training will show themselves by an improved carriage of the body, both on and off duty, a power to undertake successfully severe exertions on the march and in manœuvres, and to overcome artificial and natural obstacles.

Coming next to the "free gymnastics" we find that there is little change in the exercises without word of command. On the other hand the exercises by word of command are ruthlessly excised. The head and arm movements are reduced to two each, viz. (I give the corresponding English, or rather Swedo-English names) "head bending backward and forward," and "head turning"; with "hips firm," "arms outwards, sideways, and downward stretch," which includes "arm bend." This is the exercise rather objected to by Captain Balck, on account of the faulty position of the elbows. Exercise 22 of the old manual, which Captain Balck favours, is abolished, which certainly seems a mistake, as it is an excellent movement for suppling the tissues in the vicinity of the shoulder. "Arms upwards stretch" is also omitted. These two exercises represent nineteen different movements in our book. Coming next to trunk movements we find only "trunk forwards and backwards bend." Two old exercises ("trunk sideways bend," and "trunk twisting") neither of which is in our book, are omitted. Leg movements are limited to "knee bending" and "foot sideways place" in which the foot is kicked smartly outwards. This is the exercise No. 28 of the old manual praised by Captain Balck. Four exercises in all are excised here. "On the heels raise" is also retained. The standing jump, and the standing jump with one foot advanced, close the list of "free gymnastics without word of command." These occupy eight pages of the new manual as against fifteen in the 1895 edition. They are represented in our manual by groups A, B, C, and D (38 pages), part of Group E, say, 15 pages, Group G, H. and I, 44 pages, and part of Group K, and all Group L. It may in short be stated that this part of the German manual indicates a tendency to limit the exercises in the gymnasium to those that are likely to be of use to a man afterwards, and to such as are necessary to render supple joints not in general use amongst inactive young men. This is probably a result of the training being entirely regimental and perhaps also to a deficiency of instructors. The great drawback to all free gymnastics is that in a large class a man can go through all the movements ordered without turning a hair, and often without even contracting properly any muscle.

Coming next to the "exercises with rifles" the first change is in the preparatory position, in which the rifle is held in both hands horizontally across the body with the arms at full length, instead of, as previously, flexed at the elbow. This seems a sensible alteration. The exercises with both arms are simplified and it is evidently intended that too much time should not be spent on these, as the extra positions recommended with a view to rendering the movements more exacting are reduced from five to one. The same tendency is evident in the exercises with one arm only. The movements are much the same, but several that were previously done by word of command are now done "taking your own time." These exercises with the rifle are designed apparently to enable the soldier to handle his fire-arm with ease and, if the expression may be allowed, familiarity, and to do away with the stiffness inherent in pure aiming drill.

The portion of the manual devoted to "exercises with apparatus" is reduced from 41 pages to 24, and though this is partly due to the fact that the men are now divided into two classes only instead of four, the change is not without considerable significance. The apparatus is limited to an adjustable horizontal bar, about 2 in. thick, and 3 to 4 in. in vertical measurement, a jumping stand with a weighted string to mark the height jumped, a horse, and a climbing frame with vertical and sloped ladders, ropes, and poles. The work on the horizontal bar seems to me still far too much on acrobatic lines, and might well be cut down to one half. Pulling up, mounting on the bar, and jumping off it are all useful exercises as they are just the class of movement which a soldier might have to perform on active service, but circling might well have followed some of the other obsolete exercises. The same beam is used for vaulting. The horse does not appear but was added in 1897 in the 1895 manual. The exercises are simple and "splits" are apparently not practised.

The applied gymnastics begin with balance movements on the beam, which are limited apparently to walking, and movement in a "riding" position. A new exercise is that of creeping under an obstacle (*Kriechen*) which it is recommended should be practised under obstacles of varying breadth, both forwards and backwards, and also in heavy marching order. This is followed by jumping with and without arms over the jumping rope, hurdles, hedges, &c. Climbing over a ten to thirteen-foot wall is given a good deal of attention, and various methods with and without ladders and ropes are described. The whole of this part is most useful. The most important change, however, is at the end of the manual, namely the section on games. The most interesting are a game closely resembling prisoners' base, hand ball, and football on Association lines. In this last the game is played with eleven a-side, divided into a back, two half backs, three-quarter backs and five forwards. It is interesting to note that we who as a nation have always prided ourselves on getting our physical training out of our games, should now be turning to formal exercises for that purpose whilst the leading military nation on the Continent is showing a distinctly opposite trend. There is not the slightest doubt in my mind that this new German manual shows a distinct advance in the right direction. We were undoubtedly right to leave our old gymnastic system which tended so strongly to the acrobatic side, but the danger of the Swedish system is that it is apt to lead to mere meaningless posturing. The illustrations in the German manual are a weak point, as they are in our own. One on p. 60 of the former, showing a man lying upon a roof, and supposed to be in a position to help a comrade up with a rope, is sufficient to make one giddy to look at. The Austrian Manual is illustrated with reproductions from photographs and is infinitely more instructive in consequence.

Editorial.

FINAL REPORT OF THE ROYAL COMMISSION APPOINTED TO INQUIRE INTO THE RELATIONS OF HUMAN AND ANIMAL TUBERCULOSIS.

THIS report is of such great importance both from the scientific and administrative points of view that we think a brief summary of the results will be of service to those who have not the opportunity of consulting the original document. The report is divided into ten sections:—

The first section deals with types of tubercle bacilli. The Commission now recognize three types of tubercle bacilli; these are the *human, bovine* and *avian.* The human type is the organism present in the majority of cases of tuberculosis in man; but in some cases of the human disease the bacilli present are of the bovine type, and in others the bacilli have special characters distinguishing them from each of three principal types. In cases of natural tuberculosis in cattle, the only type of bacillus is the bovine type. Similarly in cases of natural tuberculosis occurring in poultry, the bacillus belongs to the avian type.

THE BOVINE TUBERCLE BACILLUS.

The bovine tubercle bacillus is described as growing slowly on serum, and at the end of two to three weeks shows on the surface of the medium a thin, greyish, uniform growth, not wrinkled and not pigmented. The Commissioners admit that the rate and kind of growth should not be taken as the sole basis of identification; the characters of the growth have to be considered in relation with the results of inoculation before it can be said that a particular bacillus is or is not the bovine bacillus. When standard doses of the bovine bacillus are injected into calves and rabbits, characteristic effects are produced. In calves the subcutaneous injection under the skin of the neck of 50 mg. of culture of bovine bacilli not older than three weeks produces generalized tuberculosis, starting from the point of inoculation, and ending fatally within eight weeks. The local lesion is a mass of caseous tubercles, infiltrating the adjoining skin and muscle. The prescapular gland is a mass of caseous tubercle, as is also the prepectoral gland, and to a less extent the thoracic and mediastinal glands. Tubercles, more or less caseous, are found in very many lymphatic glands. The lungs, spleen, liver, and also the kidneys are studded with tubercles, many of them caseous. Tubercles are found in the pleura, on the omentum, on the peritoneal surface, and in the intestinal walls. This severe general tuberculosis, produced by the dose of 50 mg. of bacilli, is regarded as a standard of virulence for comparison with that of the other bacilli investigated.

In rabbits generalized tuberculosis ending in death within five weeks is produced by the intravenous inoculation of 0·01 to 0·1 mg. of culture of bovine tubercle bacilli. The results produced by injecting bovine bacilli into rabbits were so definite that in their later work the Commissioners considered it sufficient to inject rabbits for purposes of differential diagnosis.

The bovine bacillus also produces acute tuberculosis in the chimpanzee, monkey, guinea-pig, goat, pig, and cat. The mouse, rat, and dog are highly resistant to it. In the fowl only local lesions are produced by subcutaneous injection; on the other hand, intravenous injection causes death, apparently due to the toxic effect of the bacilli.

THE HUMAN TUBERCLE BACILLUS.

The human tubercle bacillus grows more rapidly on serum than the bovine tubercle bacillus, and on glycerinated media the growth becomes wrinkled and pigmented. Its effect on animals is also quite different. The standard dose of 50 mg. injected subcutaneously into calves produces as a rule only a local lesion; also the standard dose of 0·01 to 0·1 mg. injected intravenously into rabbits causes a slowly progressive disease with limited lesions, in marked contrast to the acute tuberculosis ending in death within five weeks, caused by bovine bacilli. This statement is generally correct, but the Commissioners note that Dr. Stanley Griffith considers a dose of 0·01 mg. given intravenously to rabbits is more suitable for differential diagnosis, as, in his experiments, a dose of 0·1 mg. of human bacilli sometimes produces in rabbits results indistinguishable from those of bovine bacilli.

The goat and the pig are not to any great extent affected by the human tubercle bacilli. Acute tuberculosis is, however, produced in the chimpanzee, monkey and guinea-pig by the human bacillus. The cat is resistant to the human bacillus when this is given subcutaneously, intraperitoneally, intramuscularly, or by feeding. In the fowl the effect of human bacilli is the same as that of bovine bacilli. Thus the human bacillus is distinguished from the bovine bacillus by its rapid and pigmented growth on serum and its low virulence for calves, rabbits, pigs, goats and cats.

THE AVIAN TUBERCLE BACILLUS.

The avian tubercle bacillus grows especially well on *glycerinated* media and the slimy whitish growth is *easily* emulsified, thus contrasting with the growth of bovine and human tubercle bacilli. When inoculated into fowls the avian bacillus causes tuberculous lesions in the spleen and liver and frequently in the lungs, cervical glands, muscles and bones. After feeding fowls with a growth of the avian bacillus, the lesions are the same with the exception that characteristic lesions are produced in the mucous membrane of the intestines. The rabbit and mouse are the only two mammals in which the avian tubercle bacillus causes progressive tuberculosis. The calf, pig, monkey, guinea-pig, horse, cat, rat and adult goat behave alike to the avian bacillus, which never causes a progressive tuberculosis, though it sometimes multiplies in the body and becomes disseminated in the tissues and may kill if a large dose is given intravenously.

HUMAN TUBERCULOSIS.

In the section devoted to human tuberculosis the Commissioners discuss the cases investigated by them under two headings: (*a*) cases of human tuberculosis other than lupus; (*b*) cases of lupus.

Cases of tuberculosis other than lupus.—A total of 108 individual cases of tuberculosis occurring in the human subject was investigated: of this total 84 yielded human tubercle bacilli only, 19 yielded bovine tubercle bacilli only, and 5 both human and bovine bacilli.

The cases of pulmonary tuberculosis investigated fall into two series. In the first series (14 cases) a portion of the tuberculous lesion obtained at a post-mortem examination was used for experiment. The cases were clinically all primary pulmonary tuberculosis (consumption), the main and seemingly primary tuberculous lesion being in the lung. In all these 14 cases the bacillus found was the human tubercle bacillus, and no evidence of the presence of the bovine tubercle bacillus was obtained. The second series of cases included those in which sputum alone was examined. Special precautions were taken to prevent the sputum being mixed with bovine bacilli derived from milk or butter. The results of the investigation of these cases showed that the living tubercle bacilli present in the sputum in 26 cases were human, and in 2 cases bovine. In none of the cases was there a mixture of bovine and human tubercle bacilli.

The two cases which yielded the bovine bacilli were further examined. From one of the patients additional specimens of sputum were obtained at intervals of 76, 117, and 118 days after the collection of the first specimen. Cultures were obtained direct from the sputum and they proved to be pure cultures of bovine bacilli. From the second patient one additional specimen was obtained 118 days after the first. This, like the first, yielded only bovine tubercle bacilli, which were isolated from the sputum direct and produced fatal tuberculosis in calves and rabbits. These two cases were therefore definite cases of pulmonary tuberculosis caused by bovine tubercle bacilli, and as far as could be ascertained during life they were cases of primary pulmonary tuberculosis. Both these cases died, but unfortunately a post-mortem examination could not be obtained in either case.

Five cases of bronchial gland tuberculosis were examined. Three of these yielded human tubercle bacilli; the two others gave a mixture of bovine tubercle bacilli and human tubercle bacilli. Nine cases of cervical gland tuberculosis were investigated. Of these 6 yielded human bacilli and 3 bovine bacilli. Twenty-nine cases of primary abdominal tuberculosis were examined. Of these 14 yielded bovine bacilli, 13 human bacilli, and 2 cases were proved each to contain a mixture of bovine tubercle bacilli and human tubercle bacilli. The ages of the patients in the bovine cases were as follows: 10 were one to three years old, 3 from four to five years, and 1 eight years.

The Commissioners think that the majority of cases in which the bovine tubercle bacillus is the infective agent in the human being are cases of alimentary tuberculosis. They consider that in these cases the tubercle bacilli have been swallowed, and received in this way the tubercle bacillus may pass through the pharyngeal or buccal mucous membrane and infect the cervical glands, or getting into the small intestine it may produce several different lesions such as ulceration of the gut, tuberculosis of the adjacent mesenteric glands, and of the peritoneal covering.

Cases of Lupus.—These cases are considered separately, as they present divergent features of particular interest. Twenty cases were examined, and the duration of the disease varied from three months to thirty-six years. None of the cases had undergone light or X-ray treatment, whereby the character of the bacilli might have been altered.

From nine cases bacilli presenting the cultural characters of bovine tubercle bacilli were isolated, but only one virus possessed the recognized virulence for the calf, rabbit, monkey, and guinea-pig. The other eight viruses showed a very wide range of virulence, and working on the assumption that the tubercle bacilli found in these cases of lupus might be degraded bovine bacilli, the Commissioners endeavoured to increase their virulence by passage through animals. Experiments with six viruses were made, but in only two cases was it possible to increase the virulence of the culture from the original material by residence in the tissues of the calf and rabbit so as to bring it up to the high virulence of the bovine tubercle bacillus.

From the eleven other cases of lupus were obtained viruses which manifested the cultural characters of the human tubercle bacillus, but they differed from it in that they had a lower, some of them a much lower, virulence for the monkey and guinea-pig. By residence in a monkey for 139 days the virulence of one virus, however, was raised to that of the human tubercle bacillus for the monkey and guinea-pig.

SWINE TUBERCULOSIS.

The Commissioners also investigated swine tuberculosis, and state that all three types of tubercle bacilli are capable of infecting the pig, but the human bacillus and the avian bacillus are less frequently found in this animal than the bovine bacillus. The bovine bacillus, though in many pigs it may have caused no more than a localized lesion in the submaxillary lymphatic glands at the time of slaughtering the animal, nevertheless in many instances produces a severe and generalized disease. One case of mixed infection with bovine and avian tubercle bacilli was met with, and a mixed infection with human and bovine tubercle bacilli must be considered possible in the pig, although it was not found in any of the cases investigated by the Commission.

EQUINE TUBERCULOSIS.

In equine tuberculosis bovine bacilli were found, but they had not the standard virulence in all cases. Three of the viruses gave typical results when the standard dose was injected into calves, but two others possessed very slight virulence for the calf, though the bacilli had typical bovine cultural characters.

DISTRIBUTION OF THE BACILLI IN THE SYSTEM.

Some very interesting observations were made on the fate of bacilli in the tissues of inoculated animals. It would appear that after subcutaneous inoculation rapid and abundant distribution of bacilli over the body takes place, provided the infective dose has been large and the tissue conditions of the animal such as to allow it to take full effect. Essentially this is a mechanical dispersion by means of the blood-vessels and lymph channels, and the acute tuberculosis resulting from such doses is in marked contrast to the more slowly developing generalized disease occurring most commonly in nature. In the natural disease the bacilli dispersed by the blood-vessels and lymphatics are not necessarily those primarily invading the animal, but rather their progeny, which after a conflict with the resisting tissue of the local lesion have multiplied greatly at the site of primary infection.

After ingestion it was found that the distribution in the organs of the body of the bovine and the human tubercle bacillus occurred more slowly than after subcutaneous inoculation. In these experiments the bacilli which had passed through the mucous membrane of the intestine were arrested in the adjacent glands ; some, however, appeared to have passed into the lungs and other organs of the body.

EXCRETION OF TUBERCLE BACILLI.

Some experiments by Dr. W. A. Stanley Griffith on the excretion of tubercle bacilli into the milk of healthy cows and goats after subcutaneous or intravenous inoculation of these animals should also be mentioned. The experiments showed that the inoculation of large doses, whether of bovine or of human bacilli, may result in the excretion of tubercle bacilli in the milk of the cow and of the goat without any disease of the udder being produced, and that in the case of the human bacillus the bacilli may, when large doses are employed, be present in their milk for a long time after inoculation.

STRUCTURE OF THE LESION.

Dr. Arthur Eastwood investigated the structure of the lesions produced by the three different types of bacilli. His work showed that there is no essential difference in the structure of the tuberculous lesion produced experimentally in animals by the bovine tubercle bacillus and the human tubercle bacillus. Lesions caused by the avian tubercle bacillus are generally distinguishable from those caused by mammalian tubercle bacilli, but in the case of lesions of a chronic type it may be impossible to decide by microscopic examination alone whether the tubercles were caused by avian or by mammalian bacilli.

MODIFICATION OF BACILLI.

The Commissioners devoted much time and attention to the difficult question of fixity of type of the bovine, human and avian bacilli. The problem was regarded from two points of view. (*a*) First, inquiries were made as to whether in *naturally acquired tuberculosis* there is any evidence of modification in the ordinary animal body of any particular type of tubercle bacillus—bovine, human or avian. (*b*) Secondly, whether under *experimental conditions* any, and, if so what, modification can be induced.

(*a*) As regards natural tuberculosis it is clearly stated that : From all cases of bovine tuberculosis only one type of bacillus was isolated, the bovine type ; from all birds suffering from natural avian tuberculosis only the avian type was isolated ; from the cases of natural human tuberculosis, other than lupus, two types were isolated, the bovine tubercle bacillus and the human tubercle bacillus. The only variations from the three types were found in cases of lupus and in equine tuberculosis. These are admitted to be variations and not new types. The Commissioners say that further investigations of natural tuberculosis in man and animals may possibly disclose other additional types of bacilli ; since not only in human tuberculosis does this disease when affecting the skin furnish types diverging from the human and from the bovine tubercle bacillus, but the internal organs of the tuberculous horse likewise yield divergent types.

(*b*) As regards experimental conditions all the experiments failed to effect any modification in the bovine or human tubercle bacillus.

In the last section of the report the Commissioners consider the results in relation to the terms of reference. The first question to be answered is :—Whether tuberculosis in animals and man is one and the same?

The Commissioners point out that the morbid conditions in man and animals which are embraced under the term tuberculous are all bacterial in origin. The characters which are generally relied upon to fix the species of bacteria are their morphology, their appearances in artificial culture and their pathogenic properties. It is admitted that the human and bovine types are morphologically indistinguishable. • In respect of cultural characters, the only difference between the two types is that the human type exhibits a greater luxuriance of growth on all the media employed. But the gap which separates some of the bovine bacilli from bacilli of the human type is not a wide one. As regards pathogenic action, the disease produced in guinea-pigs, chimpanzees and monkeys by both types is histologically and anatomically identical. In man the lesions produced by the human and bovine tubercle bacilli are similar and anatomically indistinguishable. The chief difference between bovine and human tubercle bacilli is the degree of virulence towards certain animals, but the Commissioners state that, in view of the discovery of the exceptional bacilli in lupus and equine tuberculosis, it is impossible to regard difference of virulence for the calf and the rabbit as sufficient to establish the non-identity of the human and the bovine types. They prefer to regard these two types as varieties of the same bacillus and the lesions which they produce in man or in other animals as manifestations of the same disease.

The second term of reference asks the question whether animals and man can be reciprocally infected with tuberculosis. To this the Commissioners reply that animals and man can be reciprocally infected with tuberculosis. Having conclusively shown that many cases of fatal tuberculosis in the human subject have been produced by the bacillus known to cause the disease in cattle, they consider that the possibility of such reciprocal infection cannot be denied.

The third question to be answered is:—Under what conditions, if at all, transmission of tuberculosis from animals to man takes place, and what are the circumstances favourable or unfavourable to such transmission?

The Commissioners discuss each type separately:

Avian Tuberculosis.—They conclude that the unmodified avian tubercle bacillus is a negligible factor in the production of human tuberculosis.

Human Tuberculosis.—They state that the bovine animal is not an active multiplier of the human tubercle bacillus, and the cow has never under natural conditions been convicted of eliminating in her milk the human tubercle bacillus.

Nevertheless, it cannot be affirmed that man is wholly free from risk through animal food of infection with that type of tubercle bacillus to which he appears most prone. The pig may have to be regarded as a possible source of the disease caused in man by that type of bacillus; for the reason that particular glands of the pig's body, which are likely to enter into certain prepared foods, do on occasion yield human tubercle bacilli.

Bovine Tuberculosis.—The Commissioners examined 128 cases of tuberculosis in the adult, and found the lesions referable with few exceptions to human bacilli. Only rarely has a pulmonary lesion in adult man yielded the bovine bacillus. Of many children dying from primary abdominal tuberculosis the fatal lesions could in nearly one half of the cases be referred to the bovine bacillus. The evidence accumulated goes to demonstrate that a considerable amount of the tuberculosis of childhood is to be ascribed to infection with bacilli of this bovine type transmitted to children in meals consisting largely of the milk of the cow.

In view of the evidence adduced the Commissioners regard themselves as called upon to declare the necessity of administrative measures for obtaining security against transmission of bovine tubercle bacilli by means of food. In the interests of infants and children and for the reasonable safeguarding of the public health generally, they urge that existing regulations and supervision of milk production and meat preparation be not relaxed; that, on the contrary, Government should cause to be enforced throughout the kingdom food regulations planned to afford better security against the infection of human beings through the medium of articles of diet derived from tuberculous animals.

Clinical and other Notes.

SOME NOTES ON A CASE OF KALA-AZAR IN MALTA.[1]

By Captain W. L. Baker.
Royal Army Medical Corps.

Towards the end of June, 1911, I was called to see a male baby, aged 19 months, who was born in Malta, and had never been out of the island. The mother stated that the child had always been pale, but had been quite lively up till a few days ago, when it had become dull and listless. On examination, the spleen was found to be enlarged to within 1 in. of the umbilicus, and there was some fever. A blood examination gave the following results: Red cells, 4,000,000; leucocytes, 4,400 per c.mm.; hæmoglobin, 25 per cent.

During the child's illness, which lasted till the beginning of September, 1910, there was some irregular fever, but the temperature never rose above 102° F. The spleen enlarged steadily till the middle of August, when it extended to an inch below the level of the umbilicus. From this time the illness was complicated by diarrhœa and hæmorrhages from the bowel, and by numerous small hæmorrhages under the skin of the limbs and trunk. A blood examination on August 12 showed that the anæmia had increased considerably. The red cells were now 2,000,000, the white cells 3,000 per cmm., hæmoglobin 20 per cent. Towards the end of August the spleen had become much smaller, and when the child died at the beginning of September, it had retracted to a finger's breadth above the umbilicus.

Leishman bodies were found (post mortem) both in the liver and the spleen; in the latter they were very numerous.

The quarters where the child lived were situated at the top of a hill well away from other houses. No dogs were kept by the parents, and no bugs were found in the house.

CASE OF KALA-AZAR.

By Major M. H. Babington.
Royal Army Medical Corps.

A gunner in the Royal Garrison Artillery, aged 21; service, five years; two of which were passed in Malta (the only station abroad in which he had served).

The patient was admitted June 15, 1910. He came under my charge a fortnight later. He complained of weakness and breathlessness on exertion. At that time there was a systolic mitral murmur and irregular pyrexia, which suggested endocarditis. His skin was of a pale lemon yellow colour. His spleen was enlarged and easily palpable.

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[1] Reprinted from the *Transactions of the United Services Medical Society.*

On June 29, 1910, there was a severe attack of epistaxis, and on July 1 there was profuse bleeding from the socket of a tooth which had been extracted six days before. An examination of the blood on this date showed 3,700 white blood-corpuscles per cubic millimetre. There was a decrease in the number of polynuclears, and a relative increase in the number of large mononuclears. No kala-azar parasites were detected.

The spleen gradually increased in size, and on July 16 it reached as low as the umbilicus and to within three finger-breadths of the middle line. The liver at this time was also slightly enlarged. The leucocytes now numbered 4,000, in the following proportions: Polynuclears, 42·2 per cent; small mononuclears, 38·6 per cent; large mononuclears 16·7 per cent; mast-cells, 0·6 per cent; transitional, 1·1 per cent.

A diagnosis of kala-azar was now made.

About the middle of August the spleen extended two finger-breadths below the umbilicus in the mammary line, the liver at the same time extending 4½ in. below the costal margin in the mammary line. Pain over the spleen was now frequently complained of, and pyrexia was more severe than at any previous period.

Throughout the course of the disease fever was nearly always present; but for days at a time the pyrexia was very slight, and during these periods the patient put on weight, only to lose it again during the succeeding wave of fever. There was no diarrhœa, but a tendency to looseness throughout. Slight œdema of the ankles was occasionally present.

Previous Medical History.—This patient was in hospital during May for an attack of fever lasting over a week. Influenza was prevalent at the time, and it was thought that his fever was due to influenza. This is now doubtful in the light of subsequent events. The patient dates his present illness from this attack of influenza.

At the end of August the patient ceased to be under my care, and I had little opportunity of making any subsequent observations on him.

Treatment by quinine, arsenic and iron had no effect. Shortly before leaving Malta he was put on senega, and Lieutenant Clarke, who had charge of the patient, thought that he seemed to benefit from it.

At the end of September the patient was invalided to England. I am informed that the diagnosis has now been confirmed by the finding, by liver puncture, of the Leishman-Donovan bodies at Netley and at the Queen Alexandra Military Hospital.

REMARKS BY MAJOR M. H. BABINGTON, R.A.M.C.

These two cases, though presenting no new features, are nevertheless interesting from several points of view.

The question naturally arises as to what extent this disease exists in Malta.

In the Annual Report of the Public Health Department of Malta, a comparatively large number of deaths—about eighty-seven last year—are shown under the head of leucocythæmia. Over 95 per cent of these deaths occurred in children under 5 years of age. At this period of life, excluding deaths under 1 year, it causes more deaths than any other disease excepting bronchitis and enteritis.

It would be interesting to know in how many of these cases the diagnosis was confirmed by an examination of the blood. I now know of several cases, returned as leucocythæmia, in which the examination of the blood showed a persistent leucopenia.

The large number of these cases occurring in a small population arouses one's suspicions, as leucocythæmia is not a common disease. Assuming that the age-group 0 to 5 constitutes one-eighth of the total population of Malta, we have a mortality from disease of 3 per 1,000 in this age-group. In other countries leucocythæmia is most common in the middle period of life, and is an exceedingly rare disease among children.

I came across an example of this so-called leucocythæmia in November, 1908. An examination of the blood showed only 2,200 white blood-corpuscles per cubic millimetre. Had the case been a true example of leucocythæmia, there should have been nearer 200,000 white blood-corpuscles per cubic millimetre. I could not get permission for a post-mortem on this child, but I had little doubt about the case being one of kala-azar.

I sent the case for publication early in 1909, stating at the same time my belief that many of these so-called cases of leucocythæmia occurring in Malta would prove to be kala-azar. In October, 1909, Lieutenant-Colonel Birt, who was then in Malta, found two similar cases in English children resident here.

In both these cases there was great reduction in the number of white cells along with marked enlargement of the spleen and irregular fever. Lieutenant-Colonel Birt was certain these were cases of kala-azar and not leucocythæmia.

In January this year Dr. Critien obtained the spleen from a case similar to these, and in it found the parasites of kala-azar. He has now recorded and published in the *Archives de l'Institut de Pasteur de Tunis* six cases in which he has found these parasites. The spleen smears from the child whose case Captain Baker has just read showed a very heavy infection with these parasites. This was confirmed by Lieutenant-Colonel Sir W. B. Leishman, to whom I sent specimens. This makes a total of eight cases definitely proved to be kala-azar, and at least five others almost certainly kala-azar, coming under observation during a period of eighteen months, when no very diligent search had been made to find them. So there can be little doubt that kala-azar exists here to a very considerable extent, and is responsible for a number of deaths among children every year in Malta.

In Tunis also the disease appears to attack infants almost exclusively, and it is assumed on this account that the parasite found in these infantile cases is different from the Indian variety. I do not think that at present there are sufficient grounds to warrant this assumption.

The Indian variety also exacts a heavy toll among children—in fact, its chief incidence is among children; and although it is stated that in the Mediterranean littoral only infants are affected, the adults are by no means immune.. Gabbi has reported two adult cases—one a Sicilian, aged 18, and a native of Calabria, aged 38. Captain S. Archer, R.A.M.C., in 1907 published the case of a soldier, aged 24, reported as having contracted the disease in Crete. Three months before he became sick this soldier was serving in Malta. The case I have just read makes a fourth adult. Captain L. Bousfield, R.A.M.C., during a recent tour of investigation as to the prevalence of kala-azar in the Kassala and Blue Nile districts, encountered fifty-seven cases of the disease. The average age of those affected was about 18 years, the eldest being 40 and the youngest 6. This would seem to indicate that if there are two varieties of this disease, they both exist in North Africa.

The symptoms which I have seen in Indian cases do not differ from those I have observed here. The parasites from the Tunis and Malta cases show small differences in morphology as compared with *L. donovani*, but these differences were noted in post-mortem material, which is not very trustworthy.

Dogs have been successfully inoculated with the Tunis variety, but similar experiments with the Indian variety have yielded negative results. This is the only experimental proof in favour of the theory that there are two varieties of kala-azar.

As to the causation of this disease, there is little doubt that it is spread through human intercourse, but it is quite unknown how the parasite leaves the body of the infected, and how it is conveyed to the healthy.

As the parasite is occasionally found in the peripheral blood, it is obvious that a blood-sucking insect could effect the transfer, and Rogers has advanced good reasons for suspecting the bed-bug to be the intermediary. In the bed belonging to the patient whose case you have just heard, we found numerous bugs. I was not able to determine the variety, but Professor Newstead has kindly promised to do this for me.

In 1907, Nicolle inoculated a dog with splenic blood from a case of kala-azar. When the dog was killed four months later, numerous kala-azar parasites were found in the spleen, bone-marrow, and liver. Nicolle had previously noted that his kala-azar patient had been in the habit of playing with dogs. This suggested to him that the disease was canine in origin, and in an examination of forty dogs he found in one of them—in the spleen, bone-marrow, and liver—parasites similar to the Leishman-Donovan body. In a subsequent examination, out of 222 dogs four showed spontaneous infection. Of fifty cats examined, none were found infected. Nicolle now holds the opinion that infantile kala-azar of Tunis is an infection of the dog transmissible to children.

Several other observers have since found these parasites in dogs. Thus Basile examined thirty-three dogs near Messina, where a focus of kala-azar exists. The method he employed was that of puncturing the femur and spreading the liquid so obtained on a slide. Out of thirty-three dogs thus examined, parasites were found in twenty-seven. In all the houses containing infected children he found infected dogs, and in several instances where infected dogs were found in houses, kala-azar subsequently attacked the inhabitants of these houses. At Rome, where kala-azar is not supposed to exist, he found sixteen infected dogs out of sixty examined.

In Lisbon, where a case of kala-azar has been recently noted, Aloares and Da Silva found one dog infected out of nineteen examined.

Critien, in Malta, out of thirty dogs examined, found the parasite in three.

In India, Donovan has examined the spleens of 1,150 dogs; 256 of these came from a quarter infected with kala-azar. He failed to find the parasite in any of them.

Jemma at Palermo, where infantile kala-azar exists, examined 227 dogs with negative results. I have examined the spleens of eighty Maltese dogs destroyed in the lethal chamber. In only one have I found bodies resembling the *L. donovani*. In another dog from a house in which a case of kala-azar occurred, I failed to find any Leishman-Donovan bodies in the spleen, liver, or bone-marrow. In our cases there was no contact with dogs, at least no very intimate contact. The last child was frightened by a dog on one occasion; this is the only instance of which the mother was aware where the child had been near a dog.

It has been remarked, both in India and Egypt, that the disease tends to cling to rivers. It cannot very well do this in Malta, but I have been told that a few villages here produce the great majority of the cases. St. Julian, situated close to a watercourse, has a reputation in this respect.

Many of the native Maltese believe that if the clothing of an infected child is worn by a healthy one, the latter will contract the disease. If there is any truth in this belief, it would help to explain how the incidence of the disease is greater among children in temperate climates than it is in the Tropics, where the children are more or less naked.

Diagnosis.—As an alternative to the method of splenic and hepatic puncture, Pianese, of the University of Naples, recommends puncture of the superior epiphysis of the tibia or inferior epiphysis of the femur.

A drop of bone marrow, he concludes, is better for examination than 1 cc. of splenic juice.

Donovan discovered the parasites in the peripheral blood in more than half of his cases. He also recommends puncture of the head of the tibia.

It appears that in the infantile form of the disease, parasites are seldom found in the peripheral blood. Nicolle states that microscopic examination of the blood in these cases, even after centrifugalizing, is more often negative than positive.

As objections are often raised by the patients or their relatives to liver, spleen, or bone puncture, are we ever justified in making a diagnosis of kala-azar without demonstrating the parasite? I think that in Malta, where the disease is known to exist, one would be perfectly justified in making this diagnosis in a case presenting the usual symptoms of the disease, and showing a leucopenia with an increased percentage of mononuclears, and no or very few nucleated red cells, and in practice among the poorer classes where it may not be convenient to make even a blood examination, cases presenting the symptoms of this disease should be regarded as kala-azar, which is prevalent here, rather than leucocythæmia, which is a very rare disease in children.

Pernicious anæmia may also show a leucopenia, but the spleen and liver are usually not enlarged, and the stained film shows the presence of numerous nucleated reds.

From the splenic anæmia of adults the diagnosis would be difficult without the information obtained from a splenic puncture, but some assistance would be derived from a differential leucocyte count, which in splenic anæmia shows no special features, and from the presence of fever, which is not a prominent symptom in splenic anæmia.

In the anæmias of children, not due to kala-azar, associated with enlarged spleen, sometimes called splenic anæmia and anæmia infantum pseudoleukemica, leucocytosis is generally present, and, as a rule, the larger the spleen the greater the number of leucocytes. A small percentage of infantile splenic anæmias show a leucopenia, but these cases are exceptional.

Treatment.—Numerous drugs have been tried, but few of them seem to make an impression on the disease. Quinine has been advocated by Rogers, but is regarded by many as absolutely without value. The ordinary B.P. preparations of iron and arsenic are of no value.

Administration of arylarsenates suggests itself on account of the resemblance between the kala-azar parasites and trypanosomes, and the good results which have followed treatment by these preparations in the cases of animals infected experimentally by trypanosomes.

Manson reports a case in an officer successfully treated by atoxyl. Harrison and Cumming treated two cases by atoxyl, but both died.

Nicolle states that treatment by atoxyl or arsenophenylglycin has given no appreciably good results.

Ensor thought that senega would prove useful on account of its active principle, saponin, which, in high dilutions, is destructive to protozoa, and reported one apparent cure following the use of this drug.

Jemma considers that infantile kala-azar is curable by the X-rays.

Spontaneous recovery from the disease is, however, possible, and occasionally follows on an acute inter-current malady such as pneumonia, or cancrum ovis.

Captain Archibald determined that the alkalinity of the blood in four cases of undoubted kala-azar was diminished, and suggests that, as an acid medium has been found the most ideal for cultivating the Leishman body, increasing the alkalinity of the blood would be a useful therapeutic measure.

Prevention.—Until we know more exactly how the disease is spread, preventive measures can only be based on general principles. The destruction of infected quarters, and the segregation of the sick have been successful in preventing the spread of the disease among the coolies in the tea gardens of Assam. Such extreme measures could scarcely be adopted in Malta.

Measures which would be of some use here are compulsory notification and a diffusion of knowledge as to the nature of the disease, and the importance of early recognition and more exact diagnosis of cases of enlarged spleen.

In houses efforts should be made to get rid of all bugs.

The keeping of dogs in dwelling houses should be discouraged, and absolutely prohibited where there are young children.

PNEUMONIC PLAGUE OCCURRING AMONGST BRITISH TROOPS.

By Major R. A. CUNNINGHAM.
Royal Army Medical Corps.

In April, 1911, three cases of pneumonic plague occurred in the 1st Battalion Royal Scots, stationed at Allahabad. All three patients belonged to the band: Private B., admitted April 19, 1911, died April 25, 1911; Drummer G., admitted April 21, 1911, discharged July 12, 1911; Bandsman N., admitted April 21, 1911, died April 26, 1911.

The first thing to occur to the mind of anyone reading the above lines will probably be that, in spite of the extremely fatal character of the disease, one of the cases recovered, and perhaps this fact will give rise to a doubt as to whether the men were actually suffering from pneumonic plague.

The diagnosis was based on a consideration of the following facts:—

(1) The sputum was examined microscopically, and numerous non-Gram staining bacilli, morphologically identical with plague bacilli, were found. The bacilli were small with rounded ends, and some of them showed bi-polar staining.

(2) Some of the sputum was injected subcutaneously into a young guinea-pig. The animal died in twenty-four hours, the lesions being typical of plague, viz., hæmorrhages, enlarged and inflamed lymphatic glands, and congested spleen. Smears on agar were made from the lymphatic glands and the spleen, and typical cultures of the plague bacillus obtained.

On microscopical examination of the young cultures they were found to consist of short bacilli, not staining by Gram's method; they showed well-marked bi-polar staining. In addition to agar, the bacillus was grown in broth and butter-broth, and the typical stalactite growth took place.

(3) Corroboration of these results is furnished by the experiments carried out by Captain Grant, R.A.M.C., after my departure on leave on May 15. On May 29 he made a smear on agar of some of the sputum of Drummer G., who was then convalescent. Some of the culture thus obtained was diluted with sterile normal saline solution and injected into a guinea-pig. The guinea-pig died in four days. On post-mortem examination the lymphatic glands were found to be enlarged and congested; there were a few hæmorrhagic effusions. The spleen was slightly enlarged and congested.

On making smears on agar from the spleen, cultures were obtained which examination showed to consist of bacilli morphologically resembling plague.

The symptoms of the patients differed in many respects from those characteristic of ordinary croupous pneumonia. For instance, Drummer G. expectorated large quantities of very mucoid blood-stained sputum, not rusty or viscid. On the other hand, the sputum of Private B. was very scanty. In all there was very great prostration, and the course of the temperature was remittent.

The patient who recovered (Drummer G.), was a man of very robust constitution. Some of the credit for his recovery may also fairly be ascribed to the treatment adopted, which was of a stimulating character from the beginning, brandy being given every hour, and, in addition to this, adrenalin chloride 1 in 1,000, ℞ xx by the mouth every two hours. This drug appeared to be particularly valuable, and no doubt helped to tide the patient over the critical period of his illness.

With reference to the recovery of patients from pneumonic plague, it may be mentioned that the Director, Bombay Bacteriological Laboratory, was communicated with. In his reply he stated that cases of pneumonic plague are known to recover. Further, referring to the length of time for which sputum remains infective, he mentions the experiments of Felix Gotschlich, who (speaking from memory), was able to isolate the plague bacillus from sputum for as long a period as three months after an attack of pneumonic plague.

Drummer G. was kept isolated until his sputum ceased to be pathogenic to guinea-pigs. On June 25 some of his sputum was injected into a guinea-pig, and the animal remained alive and healthy. Drummer G. was therefore released from isolation on July 3, and discharged from hospital on the 12th.

As the cases were diagnosed immediately upon admission, there was no delay in the adoption of suitable precautions to prevent the spread of the disease in the regiment. The following preventive measures were carried out by Lieutenant-Colonel Davidson's orders:—

(1) The patients and all their attendants (native and European) were completely isolated. The attendants were inoculated against plague, and wore mouth-protectors when in the ward.

(2) All the contacts (viz., the whole band and drums) were segregated in camp for ten days. The men in camp were inspected three times a day by an assistant surgeon and once daily by a medical officer.

(3) All the officers and men of the battalion at headquarters, with the exception of three, were inoculated with Haffkine's vaccine. The dose given was 4 cc. The reaction in some cases was very severe, the fever lasting four or five days.

(4) The barrack-rooms were vacated and disinfected, and were afterwards limewashed.

(5) Clothing and bedding were disinfected.

(6) The musical instruments were disinfected.

(7) The men were given a lecture on the mode of spread of the disease, and the way to prevent it.

(8) Steps were taken to destroy all rats in barracks.

(9) All patients admitted with fever from the battalion were kept in an observation ward until it was certain that they were not suffering from plague.

(10) All the native followers of the regiment were medically inspected daily.

The cause of the outbreak has not been positively traced. It is probable that the infection was not contracted in Allahabad, as the cantonment and the regimental followers were free from plague. A possible explanation is that the source of infection was a dirty third class railway carriage, in which the band travelled to Benares on April 3. This carriage had been full of natives immediately before the band went into it, and, owing to want of time, it had not been cleaned out. The clothing or kits of some of the men may have got infected in this way.

It was fortunate that Lieutenant-Colonel Davidson was able to procure at once a sufficient amount of vaccine from the medical officer in charge of the cantonment hospital and the civil surgeon in Allahabad, otherwise an important prophylactic measure would have been delayed. In view of the great prevalence of plague amongst the natives, and the consequent increased danger of outbreaks among the European troops, it would be a wise precaution to have a certain amount of plague vaccine always available for immediate use, so that at least all contacts could be inoculated at once.

These cases show the importance of the routine examination of the sputum, as it was thus that the disease was detected; secondly, they show that patients suffering from pneumonic plague must be isolated until they cease to be infective, and that this may not be for at least a month after apparent recovery; and, lastly, they show the good results to be expected from the prompt application of the proper prophylactic measures when an outbreak of plague occurs.

A MAGAZINE MORPHIA SYRINGE.

By Lieutenant C. CLARKE.
Royal Army Medical Corps.

The magazine morphia syringe is designed for use on the field of battle, on board warships in action, and in situations where many wounded are collected together, and the usual facilities of a hospital are not available.

The apparatus for morphia administration at present in use consists of: (1) An all-metal hypodermic syringe; (2) morphia in the form of solution or in "tabloids."

In the field there are many difficulties encountered in using this apparatus. The needle is not sterile; it cannot be boiled in the field. In practice, no doubt the flame of a lighted match could be used; a strong wind, however, would render this a difficult operation. Matches may have been forgotten, or the lighting of a match at night would very likely draw the fire of the enemy.

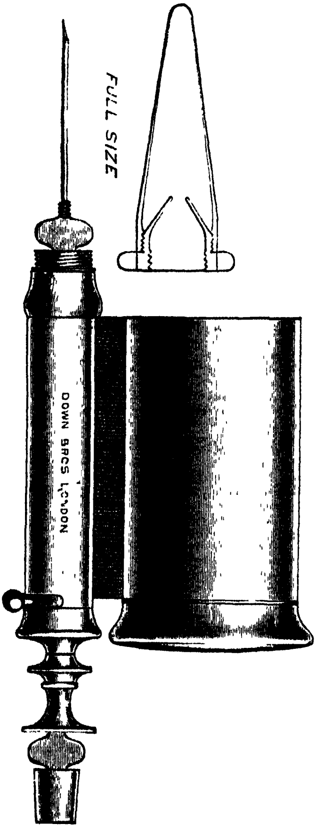
If the morphia is carried in solution, a special bottle is required for this purpose. The filling of a hypodermic syringe from this bottle, though easy enough under ordinary conditions, becomes somewhat difficult on the battlefield during the excitement of an engagement. There is also a constant danger of the bottle being upset and the morphia solution being lost. If the syringe has to be filled at night, all these difficulties are increased.

Morphia "tabloids," though easily carried, have many disadvantages. They are small objects to handle in moments of perhaps great excitement and hurry. Water is required to dissolve the "tabloids," and unless a special bottle of water is carried, sterile injection cannot be given.

Morphia "tabloids" can be given by the mouth. If the patient, however, has a dry, parched mouth and there is no water for him to drink, the morphia given in this way cannot have the same rapid and certain action as when given by hypodermic injection.

The following advantages are claimed for a magazine morphia syringe:—

(1) When filled it is ready with fifteen consecutive doses.



(2) It is a complete instrument, as compared with hypodermic syringe, "tabloids," water-bottle, and matches.

(3) It is very simple to fill and use.

(4) No light is required to give an injection, the sense of touch being sufficient at night.

(5) The needle is carried immersed in a powerful antiseptic—10 per cent thymol.

(6) The apparatus is made of metal throughout; it can be boiled and taken to pieces for cleaning.

(7) A magazine syringe with thirty or forty doses could easily be made by simply enlarging the reservoir.

(8) The apparatus is small and is easily carried in a pocket.

In the accompanying diagram of the magazine syringe the needle-cap has been removed and is shown in section.

When filled it contains fifteen consecutive doses of morphia, each dose consisting of 20 minims, the amount of morphia given with each dose being regulated by the strength of the solution used.

The magazine syringe consists of three principal parts: (1) The reservoir, (2) the syringe and needle, (3) the needle-cap.

The reservoir is a hollow metal cylinder with a screw on the lid; its capacity is 300 minims. The syringe consists of an outer barrel, an inner barrel, and a piston. The outer barrel is fixed to the reservoir and communicates with it through a small hole. The inner barrel fits exactly within the outer barrel, and can be rotated by means of a small projecting pin or knob, which moves in a slot cut in the outer barrel. The piston works up and down within the inner barrel. A spare needle is carried screwed into the handle of the piston. There is a small hole in the wall of the inner barrel, and this hole can be made to communicate with either the reservoir or the needle by simply rotating the inner barrel.

To use the syringe the reservoir is filled with 300 minims of morphia solution.

The knob at the side of the syringe is then pushed over towards the reservoir. On withdrawing the piston, 20 minims of solution are sucked into the syringe from the reservoir. The knob is then pushed away from the reservoir, and the fluid in the syringe, being now placed in communication with the needle, can be expelled by pressing down the piston in the usual way.

Two points, however, require attention in using this syringe:—

Firstly, when filling the syringe from the reservoir, the instrument must be held with the needle end down, so that the solution covers the opening of the communicating passage between the reservoir and the syringe.

Secondly, each time a syringeful of fluid is extracted from the reservoir, a syringeful of air must be drawn in through the needle and injected into the reservoir, to take the place of the fluid removed. If this is not done, the negative pressure within the reservoir very soon interferes with the suction power of the piston in the syringe.

The needle-cap is a conical metal tube which screws on to the syringe and protects the needle. The cap contains 10 per cent thymol dissolved in olive oil. The antiseptic oil is unable to escape when the cap is removed, owing to the presence of a cone-shaped diaphragm made on the principle of a safety inkpot. The needle passes through a central hole in this diaphragm into the cavity of the needle-cap. The needle is thus carried immersed in a strong antiseptic solution, which also prevents any rusting of the steel.

The magazine syringe is also very useful for operations under local anæsthesia.

When filled with a 0·6 per cent boiled solution of β eucaine, the syringe contains sufficient anæsthetic for the completion of most operations, and being small in size, it occupies very little space in the instrument tray.

For operations on hernias, varicose veins, varicoceles, &c., it is advisable to file off the point of the spare needle, which is carried screwed into the handle of the syringe.

The sharp needle is then used for penetrating and anæsthetizing the skin; it is replaced by the blunt needle as soon as the deeper tissues are exposed.

The blunt needle can then, for example, be safely inserted into the spermatic cord, to anæsthetize the surroundings of a hernial sac, without any fear of wounding the contained blood-vessels, nerves, and other important structures.

For carrying the magazine syringe in the field, a small leather pouch has been made.

The pouch can be carried in the left breast pocket of the khaki jacket, and is secured by means of a lanyard which passes round the neck, and is attached to the pouch by a ring.

The pouch also holds a small metal tube of "tabloids," each "tabloid" containing 5 grains of morphia.

One of these "tabloids" dissolved in the reservoir full of water will make fifteen doses of morphia solution, each dose containing $\frac{1}{3}$ gr. of morphia.

Messrs. Down Brothers, London, who made the syringe for me, have kindly lent the woodcut for the accompanying illustration of the magazine syringe.

NEW IMPROVISED SPLINT IN PLACE OF RIFLE SPLINT FOR FRACTURES OF THE THIGH.

By Lieutenant-Colonel M. J. SEXTON, Lieutenants E. L. FYFFE and J. K. GAUNT.
Royal Army Medical Corps.

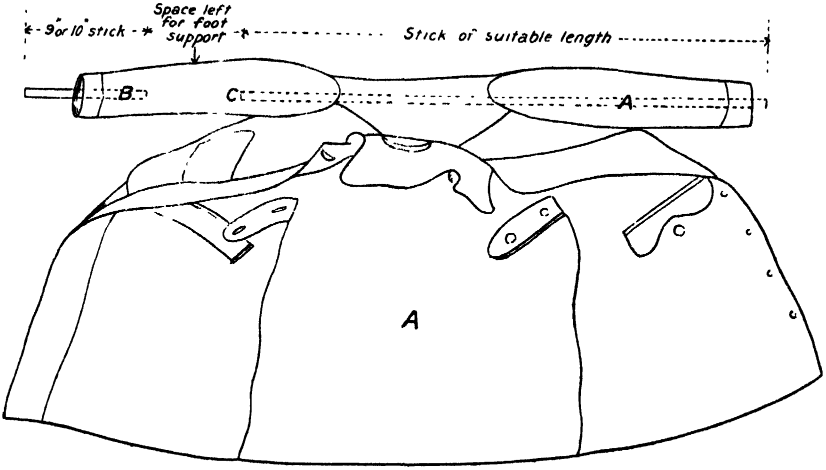
The fact that the new pattern rifle is considerably shorter than the old pattern one has rendered necessary the improvization of another splint for the first aid treatment of fractures of the lower limbs. The new pattern rifle is too short to allow of its being placed high in the axilla and at the same time obtain proper fixation round the foot.

Serjeant D. J. Bell, R.A.M.C., has suggested a new splint for which the following articles of equipment and kit are required :—

Waterbottle strap	1
Greatcoat and mess tin straps	2
Mess tin straps	2
Haversack	1 (new pattern).
Greatcoat	1
Puttee	1

Two pieces of wood of suitable length.

It may, however, be stated that string, a puttee, or other suitable articles could be used instead of the straps, and the rifle and bayonet instead of the pieces of wood.



Coat prior to being rolled.

FIG. 1.

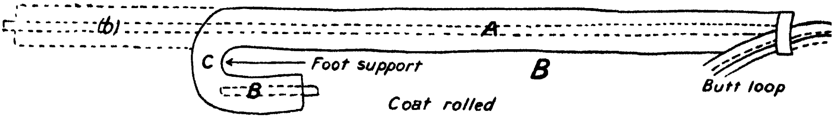


FIG. 2.

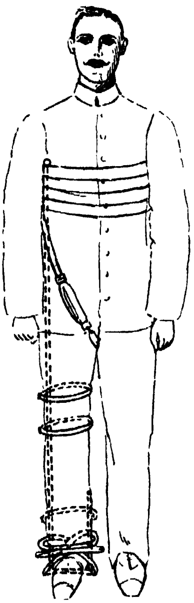
The new web equipment is most suitable for the purpose.

Method of applying and fixing the suggested splint for fractures of the thigh:—

First remove the patient's equipment, then, taking up his greatcoat, turn it completely inside out, including the sleeves.

Having procured two pieces of wood of suitable length, i.e., one piece sufficiently long to extend from the axilla to the foot (*A*) and the other about 9 in. to 10 in. long (*B*), pass the longest one through both arms of the coat to a point within 14 in. of the end of the sleeve.

Pass the shorter piece into the other end of the sleeve for a distance of about 10 in. This leaves a space of 4 in. (*C*) between the end of each stick, both pieces of which are enveloped by the sleeves. The object of this space is to allow the coat to be folded at this point, so that it fits on either side of the foot in the form of two lateral splints jointed together at one end. This being done, stretch out the coat to its full extent as shown in fig. 1, then tightly roll the coat towards the bottom and the whole takes the form shown in fig. 2 (dotted lines show hidden sticks). The splint is now ready to be placed in position and can be applied to either leg.



To apply the splint.—The part (C) is fitted over the sole of the foot, the part (A) on the outside of the leg, and the part (B) on the inner side of leg.

To fix the splint.—Place the centre of a water-bottle strap over the instep, cross behind the ankle, carry it round again in a figure-of-eight fashion, and from thence out at an angle round the heel and buckle off.

Then take a small strap, carry it round the calf of the leg over both the short and the long splint and buckle off on the outside over the splint.

This being done, form a "butt-loop" with the haversack sling and place it over the head of (A), one end being carried round under the "fork."

Take a second small strap, slip the buckle end of it over the hook of the haversack sling, carry the other end of the strap to, and pass it through the buckle at the other end of the sling, and carry it back to the hook and buckle off.

This allows of increased or decreased extension, and is accessible and easy of adjustment.

A small splint can be made by rolling the bag of the haversack, from which the sling to form the "butt-loop" was detached; when tightly rolled and pressed flat, it can be applied over the seat of the fracture, and fastened with the two remaining straps.

The puttee is next wrapped round the chest and tied off.

The feet may be fastened together by means of the patient's belt.

When used for fractures of the leg alone, the pieces of wood are equal and of suitable length, their application being similar, with the exception of the "fork" band and the puttee round the chest. It may be added that the spare puttee could be used as a bandage to fix this splint, also that the splint is padded, and wherever the soldier is, his puttee and coat are usually available. For the leg this device acts as an excellent box-splint.

Report.

TACTICAL EXERCISE FOR MEDICAL OFFICERS.

By Lieutenant-Colonel S. WESTCOTT, C.M.G.
Royal Army Medical Corps.

The following is a short account of a medical staff ride held at Mhow, Central India, in connexion with the course of war training reported in a previous number of the Journal.

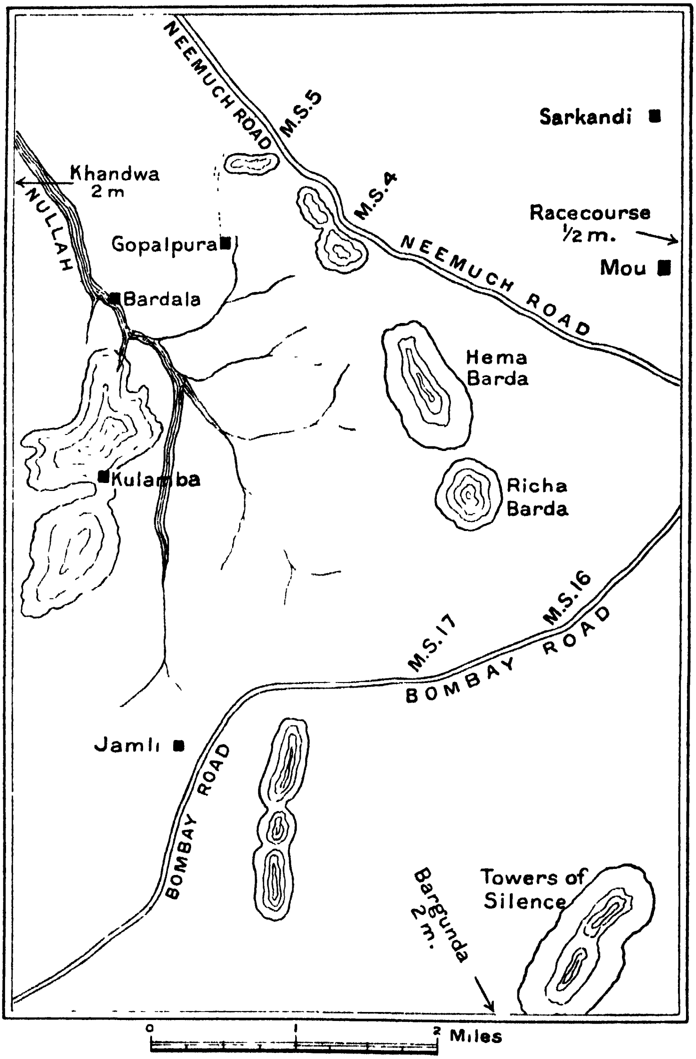
Station orders by Major-General J. S. S. Barker, C.B., commanding 5th Division, and Commanding at Mhow. Thursday, October 6, 1910.

(697) *Tactical Exercises.*—A tactical exercise for medical officers, with skeleton troops will be held on Friday, October 14. All medical officers available will attend.

(2) Lieutenant-Colonels Short (R.H.A.), Smith (2nd Rajputs), and Betham (101st Grenadiers) will act as brigade commanders. Each will be accompanied by eight mounted men with flags to represent troops. These troops will be detailed by Officer Commanding Inniskilling Dragoons.

(3) The Officers Commanding 2nd East Lancashires, 2nd Rajputs, and 101st Grenadiers will each detail four officers to act as battalion

commanders, and the Officer Commanding Brigade Royal Horse Artillery will detail a Captain or Major to act as commander of the divisional artillery.



(4) The general and special ideas and divisional operation orders will be issued on the afternoon of October 13, and on receipt of these brigade commanders will issue their own orders.

GENERAL IDEA.

Two countries, NORTHLAND whose capital is GWALIOR, and SOUTHLAND whose capital is NASIK, and the boundary between which is the NERBUDDA, have been on the point of a quarrel for some time. On October 1, 1910, SOUTHLAND, whose mobilization arrangements are in a more forward state than those of NORTHLAND, declares war; and orders the troops at BERWANI (about a Division) to advance north-east along the BOMBAY-AGRA road, and hold the ground in the neighbourhood of MOU, so as to cover the advance of their main army up the Ghats (VINDHIA range).

The NORTHLAND Government despatches the garrison at GOONA (headquarters of the GOONA Division) to drive back the advanced force of SOUTHLAND down the GHATS; reinforcements from BHOPAL are ordered to join the GOONA Force, and the main NORTHLAND Army is ordered to concentrate at GWALIOR.

The GOONA Force (strength as below) arrived at INDORE on October 10, and found some of the SOUTHLAND troops entrenched across the INDORE-MOU road on the RAO ridge.

Goona Force. —Two Squadrons Cavalry, 1 Brigade Royal Field Artillery, 1 Brigade British Infantry, 1 Brigade Indian Infantry, 1 Battalion Pioneers, 1 Field Company (S and M), 2 British Field Hospitals, 1½ Indian Field Hospitals.

The NORTHLAND reinforcements from BHOPAL (strength as below) were still two days north of INDORE, but the General Officer Commanding GOONA Division attacked at once, and after severe fighting on October 11, drove SOUTHLAND force from the RAO ridge, and bivouacked on the ground gained; SOUTHLAND retired to hills four miles south-west of MOU.

Bhopal Force.—Two Squadrons Cavalry, 2 Mounted Batteries, 1 Brigade British Infantry, 1 Field Company (S and M), 1 British Field Hospital, ½ Indian Field Hospital.

General Officer Commanding GOONA force then decides to wait at RAO two days, until the BHOPAL force reaches him. This force arrives on October 13, and the GOONA Division being then complete, the General Officer Commanding moves forward and camps on night of 13th at SARKANDI and MOU.

SPECIAL IDEA.

Reports are received by General Officer Commanding GOONA Division on 12th and 13th, that parties of the enemy have been seen entrenching on TOWERS OF SILENCE Hill, on hills one mile east of JAMLI, and on the hills to west and north-west of JAMLI.

At midday on 13th information is received from native spies that a large SOUTHLAND force of all arms has arrived at KHAL GHAT on NERBUDDA, 23 miles south-west of MANPUR and is making preparations to cross the river on the 14th.

On afternoon of 13th the General Officer Commanding GOONA Division personally reconnoitres the enemy's position, and finds that he is occupying the hills mentioned above. He comes to the conclusion that the enemy's right is at the TOWERS OF SILENCE and his left at KULAMBA.

He determines to attack the SOUTHLAND position on morning of 14th before reinforcements can arrive from KHAL GHAT.

Note 1.—MHOW cantonment is supposed to be non-existent.

Note 2.—The 1st Brigade consists of:—11th Infantry, 12th Infantry, 13th Infantry, 14th Infantry; 2nd Brigade consists of: 21st Infantry, 22nd Infantry, 23rd Infantry, 24th Infantry; 3rd Brigade consists of: 31st Infantry, 32nd Infantry, 33rd Infantry, 34th Infantry.

Note 3.—As regards the times given in "Operation Orders" for the movement of troops, the hours 5 a.m. and 5.30 a.m. have been entered as being suitable for the actual operations. In the tactical exercise, however, for the convenience of officers, these will be taken to be 7.30 a.m. and 8 a.m. respectively.

Note 4.—Lieutenant-Colonel Westcott, C.M.G., V.H.S., R.A.M.C., will officiate as Principal Medical Officer of the GOONA DIVISION.

Operation Orders, No. 5.
By Major-General J. S. S. Barker, C.B.
Commanding Goona Division. Sarkandi
Reference 1 in. Map of Country. 13th Oct., 1910.

(1) The enemy are reported to be holding a position from TOWERS OF SILENCE through JAMLI to KULAMBA. Reinforcements may reach him on the 16th October. Our main army began to leave GWALIOR by route march on 10th October.

(2) The General Officer Commanding proposes to attack the enemy's position early on the 14th, and drive him down the Ghats before reinforcements can reach him. To do this his intention is to occupy the hills of HEMA BARDA and RICHA BARDA with the advanced guard, while the main body assembles at the 4th and 5th milestones on the NEEMUCH road, and then attacks in the direction of KULAMBA. The cavalry will be posted near KHANDWA with a view to operating against the enemy's left and rear.

(3) An advanced guard (as below) will pass MOU village at 5 a.m. and occupy the high ground at HEMA BARDA and RICHA BARDA. The cavalry ½ squadron will then move off to East and guard our left flank. Special attention to be paid to the BARGUNDA road. When HEMA BARDA and RICHA BARDA have been occupied, the main body of the 3rd Brigade will be closed up in rear of and between the two hills under cover, and will form the General Reserve under orders of the General Officer Commanding Division.

Lieutenant-Colonel Betham, ½ Squadron 51st Cavalry (less 12 orderlies).
No. 3 Brigade Indian Infantry (less ½ Battalion).

(4) The main body under command of General Officer Commanding

will assemble on NEEMUCH road as follows: No movement to be made across the NEEMUCH road (in a South Westerly direction) until orders are received from General Officer Commanding Division.

(*a*) 1st Brigade (with attached troops as below) will leave SARKANDI at 5-30 a.m. and march direct to 5th milestone on NEEMUCH road: from there it will advance via BANJARIA and BARDALA against the hills 1 mile North West of KULAMBA.

Lieutenant-Colonel Short, 1st Brigade (British). Pioneer Battalion, 1 Field Company S. and M.

(*b*) 2nd Brigade (with attached troops as below) will leave MOU at 5-30 a.m. and march direct to 4th milestone on NEEMUCH road; from there it will advance direct on KULAMBA.

Lieutenant-Colonel Smith, 2nd Brigade (British). 1 Field Company S. and M.

(*c*) The R.F.A. Brigade (less one battery) will leave its bivouac at 5-30 a.m. and march between the two Brigades to 4½ milestone on NEEMUCH road.

(*d*) The mountain batteries will follow the R.F.A. Brigade.

(5) The 51st Cavalry (less ½ squadron) will march from its bivouac at 5 a.m. via TI and CHOTI DHANHAR to PITAMPUR. From there it will advance to KHANDWA and await an opportunity for taking effective action in the fight. During the march to PITAMPUR a flank guard will be detached to hold the high ground near 4th and 5th milestones on NEEMUCH road until the arrival of the main body there.

(6) The Supply Column and 2nd line Transport with escort (Major H., 34th Battalion, 4 companies 34th Battalion), will leave camp at 6 a.m. and will halt at South end of Race Course. Animals to be grazed.

(7) The Divisional Ammunition Column will be at KAKERPURA.

(8) The BEARER COMPANIES will accompany troops, under orders to be issued by the P.M.O.

He will also issue orders and communicate them to all concerned regarding the disposition of the Field Hospitals.

(9) A central signalling station will be established on high ground near 4th milestone on NEEMUCH road: Brigadiers and Artillery and Cavalry Commanders to maintain constant communication with it.

(10) Reports for General Officer Commanding Division up to 6-30 a.m. to be sent to his camp at SARKANDI: after that hour to the high ground by the 4th milestone on NEEMUCH road.

Issued at 5 p.m. Ocotober 13, 1910.

To.

G.O.C 1st Brigade.	No. 1
G.O.C 2nd Brigade.	No. 2
G.O.C 3rd Brigade.	No. 3
P.M.O Division.	No. 4
C.R.A Division.	No. 5.

H. R. Blore, Major
for Colonel,
General Staff.
Goona Division.

The ideas and maps having been received were distributed to the Officers and Warrant Officers attending, with orders to appreciate the General Idea, and to appreciate the Special Idea from the point of view of their appointments, only.

A "pow-wow" was held on the evening of the 13th, at which the appreciations were discussed and the personnel distributed as follows:—

Principal Medical Officer Goona Division, Lieutenant-Colonel Westcott, R.A.M.C.

Staff Officer to Principal Medical officer, Captain Honeybourne, R.A.M.C.

1st Brigade, Senior Medical Officer, and charge of 1 Battalion, Lieutenant Dalgleish, R.A.M.C.

2nd Brigade, Senior Medical Officer, and charge of 1 Battalion, Lieutenant Hendry, R.A.M C.

3rd Brigade, Senior Medical Officer, and charge of 1 Battalion, Captain Bennett, R.A.M.C., Sub-Assistant Surgeon Bhat, I.S.M.D.

Mountain Batteries, Assistant Surgeon D. Silva, I.S.M.D., Sub-Assistant Surgeon, I.S.M.D.

Brigade Royal Field Artillery, Assistant Surgeon Mason, I.S.M.D.

Pioneer Battalion, Assistant Surgeon Mackenzie, I.S.M.D.

No. 1 British Field Hospital, Major Bliss, R.A.M.C., Assistant Surgeon Sherard, I.S.M.D.

No. 2 British Field Hospital, Captain Bond, R.A.M.C., Assistant Surgeon Browne, I.S.M.D.

No. 3 British Field Hospital, Captain Foster, R.A.M.C., Assistant Surgeon Whitbread, I.S.M.D.

No. 1 Indian Field Hospital, Lieutenant Watson, I.M.S., two Sub-Assistant Surgeons.

No. 2 Indian Field Hospital, Lieutenant-Colonel Jenny I.M.S., two Sub-Assistant Surgeons.

Unit Medical Officers were reminded that they were under the orders of the Officers Commanding their units, and that the senior acted as Senior Medical Officer of the Brigade; they were instructed to co-operate with the Bearer Companies.

Officers Commanding Field Hospitals were reminded that they were not now attached to brigades, but were under the immediate orders of the Principal Medical Officer of the Division, their Bearer Companies were to maintain communications with the Medical Officers of the Brigades or areas to which they were detailed, and, with their Field Hospitals. Field Hospitals were to be opened on the echelon system. Officers Commanding were to act on their own initiative and keep the Principal Medical Officer informed of their dispositions and wants, the Principal Medical Officer would be either at the Headquarters of the Division or in touch with it by signal.

Each officer was to act in his appointment exactly as he would on actual field service; he was to issue orders to those serving immediately under him and to keep a running narrative of events, including the orders he received and issued, and the action taken in connection with them.

The Ride met the General Officer Commanding two miles out of Mhow early in the morning of the 14th; there was a council of the Divisional Staff and the Brigade Commanders at which final orders were given for the attack and medical arrangements decided. The 1st Brigade was ordered to take the Kulamba position, unaided if possible; the 2nd Brigade was to march direct to it and remain concealed in reserve. The 3rd Brigade was to await orders at Richa-Hema Barda. The guns were to open fire from the hills at 4th milestone, and the Field Hospitals were disposed as follows:—

No. 1 British Field Hospital to the 1st Brigade. The Bearer Company to follow the Brigade until it reached the zone of effective rifle fire and then take cover, looking out for a water supply for the Dressing Station. The Hospital was to remain under cover of the hills at fifth milestone, 6,000 yds. from the enemy's position, until required.

No. 2 British Field Hospital to 2nd Brigade. The Bearer Company to accompany it, and the Hospital to remain under cover of the hills at fourth milestone, also 6,000 yds. from the enemy.

No. 3 British Field Hospital, one Section to the Artillery, and three Sections in reserve at the racecourse, three miles distant.

No. 1 Indian Field Hospital to No. 3 Brigade. The Bearer Company to accompany the Brigade, the Hospital to remain at Mou village, distant 8,000 yds. from the enemy.

No. 2 Indian Field Hospital one Section to 1st Brigade. Three Sections to be in reserve at the racecourse.

NARRATIVE—The 1st and 2nd Brigades advanced as ordered, the ground was so broken and the cover so good that there were no casualties until the 1st Brigade arrived within 400 yds. of the position, and then in the assault there were 320 casualties. The hill was carried without assistance from the supporting 2nd Brigade, which had no casualties.

In consequence of this victory, the 3rd Brigade was ordered to attack the Jamli position, and the 2nd Brigade to move in support. The Bearer Companies were ordered to accompany these Brigades, and the Hospitals, including those in reserve, to proceed by the Bombay Road to the sixteenth milestone, which was about two miles from the position, and await events. This attack was unsuccessful, there were many wounded, and the Medical Services were at work all night.

At Kulamba there were 64 killed and 256 wounded, of the latter 20 per cent or 43 were able to walk to the Hospital, 60 per cent or 161 could sit up, 15 per cent or 40 required lying down accommodation, and 5 per cent or 12 could not be moved.

The battlefield was too rough for wheeled transport, the nearest road, a "kutcha" bullock cart track, was at Gopalpura, distant a mile to a mile and a half, so the Dressing Station was formed there, the dandies were sent forward, and pioneers set to work to improve the road to the Field Hospital, which had been ordered to open at the fifth milestone.

For the removal of the wounded there were eight field, and sixteen blanket stretchers available from each Battalion, or ninety-six from the whole Brigade, and twenty dandies from the Bearer Company.

The trained stretcher bearers (two per company) were told off as experts, one to each stretcher, to supervise the untrained men, of whom 500 were handed over to the Senior Medical Officer of the Brigade.

Two journeys were made by the stretchers to the Dressing Station, whence the wounded were conveyed to the Field Hospital by twenty ambulance tongas (each accommodating two lying down and two sitting) and some country carts fitted with stretchers slung on webbing attached by double spring hooks to the framework, in two journeys.

Too much space would be required for the consideration of the appreciations and narratives of the Officers and Warrant Officers, but most of them were good and indicated the intimate knowledge of field service acquired during the previous four months' course of training.

One very marked defect was insufficient training in riding and the management of horses.

Riding mules were provided for sub-assistant surgeons; two went sick, to avoid riding, the others, with one exception, walked.

At the termination of the ride a "pow-wow" was held at which Lieutenant-Colonel Westcott gave an outline of medical assistance from the front to the Field Hospital.

In the discussion which followed, the most interesting points were:—

(1) The removal of Field Hospitals from Brigades and placing them directly under the Principal Medical Officers of Divisions. It is more than ever necessary that the Principal Medical Officer should not wander from Headquarters and its signal station; in the present fighting the front of the Division covered six miles, so that the selection by him of sites for Field Hospitals and Dressing Stations was impossible; every Officer was expected to realize the responsibility of his own particular position and to rely upon his own judgment. In the words of the Field Service Regulation Part 2: "It is necessary to train subordinates to work intelligently and resolutely in accordance with brief and very general instructions."

(2) It was considered necessary that, before entering a tactical zone, the Medical Officer of a unit should have a parade of all ranks to ensure that they are fully acquainted with the use of the first field dressing and the arrangements for dealing with wounded from the battlefield to the Dressing Station. The position of helpless wounded should be marked by a rifle stuck vertically into the ground by the bayonet.

(3) The General Officers Commanding were anxious that all Medical

Officers should realize that the object of war was to defeat the enemy, and that they should studiously avoid the disclosure of positions and intentions by thoughtless exposure of the Red Cross on ambulance tongas, mules, &c., they should practise concealment until operations in the presence of the enemy were over.

(4) The importance of reducing stretcher transport to its utmost limit by advancing the wheeled transport as near to the wounded as possible.

(5) The effective range of field guns, given in Field Service Regulations as 4,000 yards, was considered by the Commandant Royal Artillery to be underestimated; as far as ours were concerned, he was of opinion that a Field Hospital would not be safe within 7,000 yards.

(6) Field Hospitals should not be opened until there was indication of the result of a battle.

(7) The communication of strategical and tactical operations by General Officers Commanding to Principal Medical Officers. The General Officers Commanding approved of this in principle, but explained that situations sometimes arose in which the intentions of the General Officers Commanding were not communicated to anyone until the actual moment of action. Medical Officers should possess a sufficient knowledge of tactics, topography, transport and other military matters to enable them to co-ordinate and operate in harmony with all other branches of the service.

(8) The Transport Officer considered that Indian Army Transport carts are unsuitable for the transport of wounded; he would always prefer country carts fitted with the spring hooks mentioned above.

AN EXPERIMENTAL MARCH TO INVESTIGATE THE AMOUNT OF FOOD REQUIRED BY MEN ON ACTIVE SERVICE.[1]

(Continued from page 308.)

APPENDIX I.

Diary of Experimental March.

October 11, 1909.—Arrived Tidworth at 9 a.m. Paraded twenty men of Loyal North Lancashire Regiment under Captain Body; weighed, took measurements, pulses, and blood pressures; also of three men, Army Service Corps; three men, Royal Army Medical Corps; and three officers, Royal Army Medical Corps. Marched at 11.30 a.m. for West Down. Day bright and cool, fresh S.S.W. breeze blowing, few clouds. Road undulating and on grass; pleasant and easy going. Halts and distance as in annexed table. About 1.30 got cloudy, and by 2 p.m.

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[1] Under the supervision of the Research Committee—Hygienic Section, Army Medical Advisory Board.

began to rain; at first drizzle with occasional showers, latterly becoming steady and heavier. Arrived in camp 4.30 p.m.; ground rather wet, but men not seriously inconvenienced. Temperatures as recorded on tables attached.

October 12, 1909.—Morning fine and clear. Wind S.S.W., some clouds. Weighed men in trousers and socks as yesterday, and again in heavy marching order. Marched off at about 11 a.m. to Durrington Walls and back. Distance and halts as in annexed table. Day remained fine and cool throughout. Men marched well, and had to be checked at hills which they were inclined to rush. Began to rain at 7 p.m. rather heavily, and continued to do so throughout night, interspersed with violent wind squalls.

October 13, 1909.—Raining hard in early morning, and continued to do so till about 9.30 a.m. Tents and ground saturated. Decided not to march owing to weather conditions. Sky cleared gradually about noon, wind veering slightly towards north, and general improvement in weather outlook. Shifted tents, which were very heavy owing to rain, to more sheltered position to east of copse about a quarter of a mile from camp ground. Sent in General Service wagon to Bulford with request for straw for tents. Visited by Captain Uniacke, attached General Staff, Southern Command. Weighed men at 2.30 p.m. Marched to Tilshead and back, about 5 miles, in evening; probably equivalent to ordinary work.

October 14, 1909.—Weighed men at 9 a.m., and marched to Bradbury Walls *via* Ridgeway, and then down to Coombe. Met Captain Uniacke by appointment, and then marched back along lower roads towards Marchfont to junction with Devizes—Salisbury Road, and back to camp. A fine day, with high clouds; fresh north-west breeze blowing, backing later towards west. Distance 14¾ miles, with about 600 ft. climb (*see* tables attached). Cloudy towards evening, and very cold. Men in good spirits, playing quoits, and kicking football in evening.

October 15, 1909.—Weighed men at 9 a.m., and marched to Yarnborough Castle, and back *via* Orcheston, Shrewton, and Winterbourne Stoke. Total distance 17 miles, with about 900 ft. ascent. Halts, &c., as on attached table. A stormy, wet day. Wind S.S.W., blowing half to full gale, with heavy rain showers. During the march out, and especially the last two or three miles of steady ascent of Winterbourne Stoke, the wind was dead ahead of the column, and must have added seriously to the amount of work done. Walking alone, as I naturally did, it required a serious effort occasionally to maintain one's footing and direction. Men thoroughly wet, and rather tired. Singing in their tents in the evening. One man, Private Mostyn, fell out faint and pale. It was discovered afterwards that he had been eating berries during the long halt, probably of the woody nightshade. The work this day was of the most arduous description.

October 16, 1909.—Weighed men at 9 a.m., and started to march to Stonehenge and back, 14 miles. Wind S.S.W., fairly strong. Day cloudy and overcast, but no rain till about last half of return march. Private Mostyn showed a profuse urticarial rash on arms and legs, and was still rather weak with a rapid pulse. Only performed a quarter of the march. Evening wet and chilly.

October 17, 1909.—Heavy rain and strong wind in night. Warm. This morning shows signs of clearing. Weighed men in trousers, and also in heavy marching order, took pulses and blood pressures, and also measurements of chest, abdomen, and calf. Cleared up towards mid-day, and was able to get tents opened, flies raised, and blankets, &c., aired.

October 18, 1909.—Night fairly fine, but started to rain heavily at 6 a.m., and continued till 9 a.m., when weather cleared from the north-west. Struck tents and waited for transport from Bulford, but as none arrived loaded up tents and kits on to one General Service wagon available and ambulance wagon. Discovered a bolt missing in spring of former which prevented its carrying more than half a load, so gave up idea of proceeding to Perham Down to-day, and sent Captain Body into Bulford for transport. Meanwhile tents had to be unloaded from the General Service wagon, and the future being so uncertain had to keep men in camp. Rations were, we knew, being sent to Perham for us, so that the necessity of getting at least as far as the stores at Bulford seemed obvious. Captain Body returned at 2 p.m. with news that a wagon was being sent, also rations in ambulance wagon. At 4 p.m. the former arrived, and we loaded and marched as far as Rollestone Camp (4 miles), where we got just before dusk, and camped. The men had a fairly hard day; striking tents, loading up, then again unloading and pitching in the forenoon, the same process being repeated in the afternoon. The evening was misty, but mild. Ground very damp.

October 19, 1909.—Morning misty, but cleared up about 9 a.m. Marched at 10 for Perham Down. Went personally into Bulford to see Officer in Charge of Supplies about rations. Arrived at Perham about 3.30. A pleasant and easy march of about 13½ miles. Road hilly, especially after leaving Bulford, and just before arriving in camp. Camp pitched under lee of Lamb Down Furse in a pleasantly sheltered hollow. Ground dry, a pleasant change after West Down. Night fine, with few clouds.

October 20, 1909.—Morning misty and gusty, wind from south and south-west. Occasional rather heavy showers. Barometer falling steadily. In spite of unpromising weather, decided to take men out. Marched by Great Shoddesdon to Biddesdon Park, and then *via* Cadley and Lower Chute to Conholt. Westwards along Chute Causeway, and home from Bell Inn, *via* the Collingbourne Woods. Weather very bad. Fine rain and mist at first with occasional fine intervals, but after we reached the top of the hills near Conholt, we got the full force of a

TABLE ATTACHED TO DIARY OF MARCH.

Date	Time of march	Length of march	Nature of ground	Duration of halts	WEATHER				Barometer	TEMPERATURE OF AIR	
					Sunshine	Wind	Cloudy	Rain		Dry bulb	Wet bulb
October 11, 1909	11.30 a.m. to 4 p.m. (4½ hr.)	13½ miles	Undulating grass road about 2½ miles	12.7 —12.12 p.m. 12.40—12.50 ,, 1.50— 2.5 ,, (feed) 3.7 — 3.17 p.m.	2 hr.	S.S.W. to strong S.S.W.	2½ hr.	2 hr. drizzle to heavy	6 p.m. 29·11 falling	6 p.m. 56	6 p.m. 56
										Max.	Min.
										Not recorded	
October 12, 1909	11.10 a.m. to 3.25 p.m. (4¼ hr.)	13 miles	Undulating grass, 2 miles. Road, 6 miles	11.42—11.47 a.m. 12.48— 1.2 p.m. (feed) 1.20— 1.25 p.m. 2.30— 2.35 ,,	Bright throughout	Cool, S.S.W.	Floating clouds	7 p.m. onwards	9.45 a.m 29·9	9.45 a.m.	
										55	52·5
										12.50 p.m.	
										61	54
										1 40 p m.	
										57·2	52
										3 p.m.	
										59·5	34
										4 p.m.	
										57	33
										Max.	Min.
										9 a.m.	
										51	39
										4 p.m.	
										65	56
October 13, 1909	3.40 p.m. to 5.45 p.m. (2 hr. 5 min)	5 miles	Undulating country roads and sere grass. Very heavy going and slippery	4.35—4.55 p.m.	Occasional gleams	Veering west north of west	Slight, clearing off	*Nil*	9 a.m. 29·0	9 a m.	
										50	49
										3.35 p m.	
										56	50
										5.30 p.m.	
										54	50

										Max. Min. 9 a.m. 52 49 3.35 p.m. 59 55 5.30 p.m. 57 53
October 14, 1909	10.10 a.m. to 3.30 p.m. (5 hr. 20 min.)	14·75 miles	3 miles grass level, and down steep hill. Remainder road undulating; one very steep hill	10.53—10.58 a.m. 11.56—12.6 ,, 1.12— 1.25 p.m. (feed) 2.35 - 2.48 p.m.	Bright	N.W., inclined to back towards end of day	Flying clouds at first, becoming thicker	*Nil*	9 a.m. 29·42	9 a.m. 50 52 11.5 a.m. 55 52 12.5 p.m. 57 52 1.30 p.m. 58 53 2.38 p.m. 56 54 3.30 p.m. 54 52 9.0 a.m. Thermometer moved and indexes obviously unreliable
October 15, 1909	10.10 a.m. to 3.45 p.m. (5 hr. 35 min.)	17 miles	Road very hilly and heavy in places	11.10—11.15 a.m. 12.15—12.25 p.m. 1.30— 1.45 ,, (feed) 2.45— 2.55 p.m.	*Nil*	S.W. to S.S.W. Half to full gale. Dead ahead of march on way out.	Thick clouds and occasional mist	Incessant. Occasional driving squalls. Squalls very severe and heavy	9 a.m. 29.20	9 a.m. 56 55 2 p.m. 56 55 5.30 p.m. 56 55 9 a.m. 56 52 5.30 p.m. 56 53

TABLE ATTACHED TO DIARY OF MARCH.—*Continued.*

Date	Time of march	Length of march	Nature of ground	Duration of halts	Weather				Barometer	Temperature of Air	
					Sunshine	Wind	Cloudy	Rain		Dry bulb	Wet bulb
October 16, 1909	10.15 a.m. to 3.15 p.m. (5 hr.)	14 miles	Hilly road; good going	11.13—11.23 a.m. 12.25—12.50 p.m. (feed) 2.5 — 2.10 p.m.	*Nil.*	S.S.W.	Thick, low clouds	Driving mist and drizzle, 1.30 p.m. to end of march. Brief, clear intervals	9 a.m. 29.10	9 a.m. 59 11.20 a.m. 61 12.30 p.m. 61 2.10 p.m. 60 3.30 p.m. 61 Max. 9 a.m. 61 3.30 p.m. 63	 58 60 50 59 60 Min. 53 55
October 17, 1909	None	None	—	—	3 to 4 hours	W.	Flying clouds	None	29·435	9 a.m. 59 Max. 65	 53 Min. 52
October 18, 1909	4.30 p.m.	4 miles	Undulating road	None	Occasional intervals	None	Heavy till 10 a.m., after that partial heavy with thick mist in evening	Heavy till 10 a.m.; some showers later	9 a.m. 29·485 3 p.m. 29·495	9 a.m. 59 3 p.m. 55 Max. 9 a.m. 60 3 p.m. 64	 53 56 Min. 46 52

October 19, 1909	9.30 a.m.	13 miles	Undulating grass. 2 to 3 miles. Undulating road remainder of way. Two steep long hills	10.30—10.45 a m. 10.40—12.10 p.m. 1.15— 1.25 ,,	Bright	S.W.	Light, flying clouds	*Nil*	9 a.m. 29·889	9 a.m. 51 | 49 10 a m. 58 | 56 Noon 57 | 56 1 p.m. 61 | 60 3.30 p m. 61 | 58 Max. | Min. 9 a.m. 36 | 50 3.30 p.m. 61 | 65
October 20, 1909	11.10 a.m.	17¼ miles	Hilly road most of the way. Very deep in places: 2 miles rough grass	12.15—12.25 p.m. 1.25— 1.35 ,, 2.35— 2.45 ,, 3.15— 3.45 ,,	*Nil*	Strong, S S.W.	Perpetual	Drizzle to very heavy	9 a.m. 29·809 5.30 p m. 29·389	9 a m. 56 | 55 12.15 p.m. 57 | 57 1.25 p.m. 57 | 57 2.35 p.m. 57 | 57 5.30 p.m. 57 | 57 Max | Min. 9 a.m. 61 | 49 5.30 a.m. 60 | 56
October 21, 1909	11 a.m.	13½ miles	Undulating road	12.0—12.5 p.m. 1.5 -1.20 ,, 2.18—2.23 ,,	Occasional	S.W.	Considerable, with occasional breaks	A few squalls	9 a.m. 28·839 3.30 p.m. 29.969	9 a m. 50 | 49 Noon. 50 | 54 1.5 p.m. 57 | 56

Table attached to Diary of March.—*Continued.*

Date	Time of march	Length of march	Nature of ground	Duration of halts	Weather				Barometer	Temperature of Air	
					Sunshine	Wind	Cloudy	Rain		Dry bulb	Wet bulb
										2.18 p.m. 55 Max. 9 a.m. 53 3.30 p.m. 61	 54 Min. 48 52
October 22, 1909	9 50 a.m.	15½ miles	Undulating road	10.55—11.5 a m. 12—12.15 p.m. 1.25—1.35 p.m.	Occasional	S.W.	Considerable	None	9 a.m. 30·169 3.30 p.m. 30·089	9 a.m. 51 10.55 a.m. 54 Noon. 53 1.25 p.m. 56 3.30 p.m. 53 Max. 9 a.m. 55 3.30 p.m. 59	 49 52 52 55 52 Min. 42 50
October 23, 1909	9.20 a.m.	8 miles	Undulating road	11—11.10 a.m.	*Nil.*	S.S.W., strong	Persistent	Driving fine rain at end of march	9 a.m. 29·899	9 a.m. 55 11 a.m. 56 Max. 9 a.m. 58	 54 56 47

S.S.W. gale with heavy driving rain getting steadily worse. Road good, though with ascents aggregating over 1,000 ft. as far as the Bell Inn, but after that bad, and steadily becoming worse. A linchpin came off the near fore-wheel of the ambulance wagon at worst part of road, and considerable efforts on part of entire detachment were needed to readjust wheel and fix an improvised pin. Road very bad till within a couple of miles of camp, then wet, and rather slippery grass. Total distance traversed, 17 miles, but in actual exertion march equivalent to far more than this. Made special issue of whisky 2½ oz., owing to men being tired and wet, and no rum available.

October 21, 1909.—Morning fine and clear, with S.S.W. wind, clouding over later. Marched about 14 miles by Great Shoddesdon to Weyhill, then along Amesbury Road to Park House, and to camp through Shipton Bellinger and Tidworth Park. Halts, &c., as per table.

October 22, 1909.—Day dull and not very promising; wind west. Marched by Great Shoddesdon to Ludgershall, and so to Collingbourne Ducis and Collingbourne Kingston. Turned west at latter place in the direction towards Everley, and through Leckford Bottom, North and South Tidworth to camp. Total distance about 15½ miles. Men do not seem quite so lively, or inclined to kick football about on return to camp as in the earlier days of the experiment. This has been noted to a certain extent ever since our change to Perham, but more marked the last two days. Private Harvey left in camp with sore feet.

October 23, 1909.—Day dull and threatening, with gusty wind from west and south-west. Weighed men earlier than usual, and packed up kits. Marched about 8 miles by Ludgershall and Collingbourne, Ducis, Leckford Bottom, and so to barracks. Weighed again here, and measurements of chest, abdomen, and calf taken again. Party dismissed about 1 p.m.

CHARLES H. MELVILLE, *Lieut.-Colonel R.A.M.C.,*
Superintending Experimental March.

(*To be continued.*)

Echoes from the Past.

THE SECOND BEARER COMPANY.

By Colonel W. JOHNSTON, C.B., M.D.
(Retired, Army Medical Staff).

In the Journal of the Royal Army Medical Corps for May (vol. xvi., p. 563) there was published the report on the organization and working of the First Bearer Company employed in the British service, and at p. 131 of the Corps News, published the same month, will be found an obituary notice of Lieut.-Colonel James Hector, to whose knowledge and zeal the country was indebted for the organization and training of this improvised Bearer Company. As mentioned in that notice, Colonel Stanley, then Secretary of State for War, said in the House of Commons that the employment of this Bearer Company was "a marked feature in field medical organization," and in truth it indicated an epoch in Army medical evolution.

The first fully equipped and trained Bearer Company to leave these shores was sent to South Africa in 1881, and as this event marks another step in the evolution of the Army Medical Service, it is believed that the following account of its proceedings may usefully be put on record, as although its services were not required in action, yet in reading the report glimpses are obtained of the Service which after the lapse of thirty years will seem extraordinary to many officers now serving under greatly altered conditions. The Report is printed from a copy of the original document which was forwarded to the Director-General of the Army Medical Department, who acknowledged its receipt in War Office letter No. 4823/7/334 of February 6, 1882. As is obvious, the footnotes, with the exception of Nos. 2 and 21, have been added for the present publication.

Report of the Proceedings of the Bearer Company, Army Hospital Corps, sent to Natal during the Transvaal War of 1880-81, by Surgeon Major William Johnston, M.D.,[1] commanding the Company.

Formation of the Company.—On the outbreak of hostilities with the Transvaal Boers, the Government determined to send a Bearer Company to the seat of war, and a company was mobilized consisting of eight officers of the Medical Department, three lieutenants of orderlies, one serjeant-major, four staff-serjeants, three serjeants, thirteen corporals, two buglers, and 118 privates of the Army Hospital Corps; with one warrant officer, two serjeants, five corporals, and twelve privates of the Army Service Corps.

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[1] The writer of this paper.

Equipment.—One half company was furnished with mountain equipment[2] and the other with wheeled transport, according to the scale laid down in the *Army Medical Regulations,* 1878. The transport animals were not provided at home, as from motives of economy it was determined to trust to the local supply on arrival of the bearer company in Natal.

Personnel.—The regulation complement of men of the Army Service Corps was also not furnished, as it was thought advisable to employ coloured drivers for the mule transport in South Africa instead of soldiers. Of the non-commissioned officers and men of the Army Service Corps, four were artificers.

The officers and men of the Army Hospital Corps were brought from various stations, and the company was formed at Aldershot under the superintendence of Surgeon Major Sandford Moore, M.B.,[3] commanding the Depot Army Hospital Corps.

Arms.—The staff-serjeants were furnished with revolvers, whilst the serjeants and rank and file were equipped with Martini-Henry carbines.

Embarkation.—The Bearer Company, having been inspected by the Principal Medical Officer, Surgeon General Stanhope Hunter Fasson[4] on January 24, 1881, on the following day was inspected by General Sir Daniel Lysons, K.C.B.,[5] commanding the Aldershot district, and thereafter proceeding by rail to Southampton, embarked the same day on board the Royal Mail steamer "Danube," for passage to Durban.

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[2] On arrival at Natal it was found this was not likely to be required, and animals were supplied only for wheeled transport.

[3] Now Lieutenant-Colonel, retired, Army Medical Staff, author of *Manual of Exercises for training Stretcher-Bearers and Bearer Companies*, first published in 1877. This was adopted as an official manual and published by Authority, War Office, Horse Guards, February, 1878. It has appeared with little modification in successive editions of the *Manual for the Medical Staff Corps* and *Manual for the Royal Army Medical Corps*, and is now incorporated in Part II. *Royal Army Medical Corps Training*, 1908. It is impossible to estimate how much the Army is indebted to this pioneer of Army Medical reform, and how much it has lost by the calamity of blindness which befel him, necessitating his too early retirement from the Service, for which he had done so much.

[4] Died at Aldershot, March 11, 1882.

[5] Afterwards G.C.B., Constable of the Tower of London.

Names of Officers.—The Officers of the Bearer Company comprised the following officers of the Army Medical Department: Surgeon Major William Johnston, M.D., commanding; Surgeon Major Thomas Faris, M.B.,[6] Surgeons Paul Bennett Conolly[7] Howard Fleetwood Babington, M.B.,[8] William Clement Milward, M.B.,[9] William Henry Bracken, M.D.,[10] Alfred Peterkin, M.B.,[11] and William Dugdale;[12] with the following officers of the Army Hospital Corps: Lieutenants of Orderlies James Gordon,[13] William Pike,[14] and Henry Smith Webb.[15]

Command on Board Ship.—There were no other troops on board the "Danube," but Captain and Brevet-Major Donald George Anderson,[16] 58th Foot, was sent by the Horse Guards in "command of the troops on board."

It is proper to mention that this officer left every detail of discipline and interior economy to the Officer Commanding the Bearer Company, by whom all orders were issued, and Major Anderson in no way interfered in these matters, but contented himself by notifying at the conclusion of the voyage his sense of the excellent behaviour of the Bearer Company throughout the voyage.

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[6] Afterwards Surgeon Major, Medical Staff. Died October 1, 1889, when holding the appointment of Staff Officer, Medical Staff Corps. Designer of the regulation field stretcher known by his name, approved in *List of Changes in War Matériel*, dated 1 September, 1882. The essential improvements in this stretcher were a very much better pattern of *traverse* to keep the poles apart the required distance when the stretcher was "prepared," and the substitution of four *rackets* carrying three-inch wooden (afterwards gun-metal) rollers for the flimsy legs with very small rollers or casters of the older pattern. This stretcher continued to be the regulation pattern until June 1, 1906, when the *List of Changes*, &c., of that date announced a new stretcher fitted with steel U-shaped runners instead of rollers.

[7] Afterwards Surgeon, Medical Staff, died at Handak, Soudan, April 18, 1885.

[8] Afterwards Surgeon, Medical Staff, resigned his commission, June 19, 1889.

[9] Resigned his commission, October 10, 1883.

[10] Died at Pietermaritzburg, Natal, April 16, 1885.

[11] Now Colonel, *late* Royal Army Medical Corps, Principal Medical Officer, London District.

[12] Now Lieutenant-Colonel, retired pay, *late* Royal Army Medical Corps.

[13] Afterwards Quartermaster, with honorary rank of Captain, Medical Staff. Died in Sunderland, March 17, 1887, when on retired pay.

[14] Afterwards Quartermaster, with honorary rank of Captain, Army Medical Staff. Died in London, June 19, 1897, when on retired pay.

[15] Now Quartermaster, with honorary rank of Major, retired, Army Medical Staff.

[16] Retired on retired pay as a Lieutenant-Colonel, with rank of Colonel in the Army, November 8, 1890.

Appointments of Adjutant, Paymaster, and Quartermaster.—On the day of embarkation the following appointments were made: Surgeon P. B. Conolly to be Acting Adjutant,[17] Lieutenant of Orderlies J. Gordon to perform the duties of Paymaster, and Lieutenant of Orderlies W. Pike those of Quartermaster. There being no special duty for Lieutenant of Orderlies H. S. Webb, I directed that he should take his turn of orderly duty along with the Surgeons.

Too many Officers of Orderlies in the cadre of a Bearer Company.—I would here remark that I consider two officers of orderlies ample for the performance of all duties, proper to their rank, with a bearer company. In fact, one would probably be found quite sufficient, since in the field the duty of a paymaster for so small a number of men is purely nominal, and in the event of the company being temporarily divided into half companies a staff-serjeant could very well perform all quartermaster's duty pertaining to the half company on detachment, merely reporting to the quartermaster with head-quarters.

Duty on Board.—While on board ship the officers and men of the company were divided into three watches, and guards, parades and other duties were performed strictly in accordance with the *Queen's Regulations.*

Instruction.—During the voyage every man was put through a course of instruction in stretcher drill and the application of first dressings under the superintendence of Surgeon Major Faris, who also gave a course of instruction to the non-commissioned officers on the special duties they would be called upon to perform on active service, and the names and uses of the various articles of surgical equipment.

Carbine Drill.—Each man was also put through a course of carbine exercise by Conductor of Supplies W. Johnson, of the Army

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[17] This was the first occasion on which a medical officer was called on to act as an adjutant, the duties of that office in relation to the Army Hospital Corps having previously been invariably performed by one of the captains of orderlies, or lieutenants of orderlies of the Army Hospital Corps, who were the precursors of our quartermasters. It is interesting to record that when the present writer was in command of the Depot and Training School of the Medical Staff Corps at Aldershot, he was instrumental in having the appointment of adjutant of these institutions transferred from the hands of a quartermaster to those of a medical officer, Surgeon George Edward Twiss, now Lieutenant-Colonel, retired pay, *late* Royal Army Medical Corps, who was appointed Acting Adjutant, July 27, 1888, and was confirmed in the appointment April 1, 1889.

Service Corps, who manifested great zeal in the performance of this duty.

Arrival in Natal.—The "Danube" arrived in the Bay of Durban on February 26, and the company disembarked that afternoon.

Durban to Pietermaritzburg by Train.—The next day, being Sunday, the company remained encamped at Durban, and on the morning of February 28, at 5.45 a.m., proceeded by special train to Pietermaritzburg.

Amajuba.—Just before leaving Durban news reached us of the fearful disaster at Amajuba, and the death of Major-General Sir George Pomeroy Colley.

The men only took with them from Durban their field kits, the remainder of their kits being left in the Government store.

Transport obtained.—On arrival at Pietermaritzburg the company was encamped, and here all the transport animals were procured, necessary equipment drawn, and the surgery wagon and five ambulances which we brought from Woolwich were put together.

The Bearer Company was here inspected by Deputy Surgeon General James Lewis Holloway, C.B.,[18] who addressed the men on the importance of the special duty they were intended to perform.

March up Country commenced.—Everything was ready for a move up country on the morning of Saturday, March 4, but the rain, which had not ceased for some days, continued, and it being useless to attempt to start the order for marching was cancelled. Next morning there was a cessation of the downpour and the march was commenced at 8 a.m. The roads were in a pitiable state, and the very steep road up the Town Hill is a well-known bugbear to the transport rider in the wet season, and is described in the "Official Route" as "almost impassable after heavy rains."

The transport supplied consisted in part of mules and part oxen. The latter are the better in wet weather. The animals forming the convoy consisted of twenty-two riding horses, seventy-six mules employed in drawing five ambulance wagons, one surgery wagon, and two general service wagons, and eighty-four oxen in five ox wagons and two water carts.

Charge of Ammunition.—The difficulty of transport was still further enhanced by a duty which the Bearer Company was ordered to perform, viz., to escort, and if necessary defend, five wagons laden with ammunition for the front.

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[18] Afterwards Surgeon General. Died at Netley, April 19, 1883.

A party of fifty "Bluejackets" under command of a Lieutenant, Royal Navy, proceeded up country at the same time as we did. They also had five ammunition wagons under their escort and always marched and encamped close to the Bearer Company. The distance to the top of the Town Hill from the camp at Fort Napier is about five or six miles, and it is impossible to exaggerate the utter badness of the road from the excessive rainfall which had prevailed.

Overloaded Wagons.—The wagons were heavily laden and it was frequently necessary to detach one "span" of oxen from a wagon in order to bring forward another by the aid of a "double span."

Difficulties from Rain and Bad Roads.—The men, by drag ropes and pushing, gave great help, and although all the Bearer Company wagons were got up and the camp was pitched at Klip Kop soon after dark, amidst a heavy downpour of rain which had recommenced in the afternoon, it was impossible to get up all the ammunition wagons that night. The oxen belonging to these wagons had therefore to be "outspanned," and the wagons left on the road all night with a sufficient guard under charge of the officer who was on baggage guard. The whole of next day was employed in getting up the ammunition wagons, but on the day following we were able to make a short "trek" over a sea of thick sticky mud which could only by courtesy be called a road.

Slow Progress.—For seven days rain was almost incessant, and our progress was very slow. The officers and men were constantly wet, but all were determined to make the best of it and were eager to push on.

Effect of News of First Armistice.—The receipt of a copy of an official telegram on March 8, to the effect that Major-General Sir Henry Evelyn Wood, V.C., K.C.B.,[19] and Mr. Joubert had agreed to an eight days' armistice (until the 14th), but directing that all military precautions were still to be observed, did not decrease the anxiety to go forward, as all supposed that after that day hostilities would be renewed, and the temporary cessation only seemed to increase our chance of "being in time."

Estcourt reached and Oxen bought.—We reached Estcourt, a distance of 61 miles, on the 14th, and here having received a telegram from the Chief of the Staff[20], directing me to "push on," and finding the oxen terribly knocked up, I purchased on my own responsibility twenty-four oxen at £16 10s. per head.

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[19] Now G.C.B., G.C.M.G. Field Marshal.

[20] Colonel Redvers Henry Buller, V.C., C.B., C.M.G., A.D.C., afterwards G.C.B., G.C.M.G., General.

Forced Marches.—The rain now ceased, and taking advantage of its being full moon we made forced marches first from Estcourt to Colenso, 22 miles, on the 15th, and next day from Colenso to the south bank of the Klip River, opposite Ladysmith, a distance of 20 miles. At both of these halts we bivouacked to save time and the fatigue of pitching camp.

Crossing the Klip River.—However, at the Klip River we were detained from the 17th to the 21st. The river was so high that the drift was impassable, and the "pont" could only be worked with difficulty. The pont was not strong enough to bear the weight of loaded wagons, so that each had to be unpacked, and only a regulated weight sent across at each trip. Consequently the whole of the 17th was occupied in getting over the ambulance wagons, and the baggage of one half company, which was sent across and encamped on the Ladysmith side of the river. During that night very heavy rain again fell, which so flooded the already swollen river as to render it impossible to use the pont, and we were only able the next day to get a few things across in a small boat with two broken oars. By the afternoon of the 19th the river subsided sufficiently to allow the pont to be again worked, and during the whole of that afternoon and moonlight night, the men unloaded the ammunition wagons, passed the ammunition and the empty wagons across on the pont, swam the mules and oxen across, and by 4 a.m. the whole convoy had crossed over.

Halt at Ladysmith.—A halt had to be made next day to rest man and beast, and on the morning of the 21st we renewed our march, reaching the Ingagane River, 55 miles from Ladysmith, on the afternoon of March 25.

"*Laagering.*"—On the nights of the 22nd and 23rd, believing that the armistice had terminated, we had taken special military precautions by "*laagering*" our encampment each night, and posting outlying sentries, etc., but on the 24th we heard the armistice was extended, and therefore these measures were in future unnecessary.

Crossing the Ingagane River.—At the Ingagane we again had a flooded river to deal with, and the same work of unloading the baggage and ammunition, and carrying it over piecemeal on a pont had to be accomplished.[21] This was, however, successfully done in one day, by dint of hard work, late and early, and on the 27th we continued our march with tolerable weather, but execrable roads, reaching Newcastle on the morning of the next day, having only completed a total distance of 174 miles in twenty-three days.

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[21] Besides the great labour of unloading and reloading the whole of the ammunition and baggage wagons at the Klip and Ingagane Rivers, it was

Arrival at Newcastle.—On joining the Field Force, which was encamped near Newcastle, we found that a six months' armistice had been arranged. The large force of all arms here assembled was destined to remain until the conclusion of that term, or until the ratification of the Convention by the Boers. Consequently, for the present, the services of a Bearer Company as such could not be required.

Officers and Men detached from Bearer Company.—Accordingly, by the order of the Principal Medical Officer, Lines of Communication and Base,[22] four surgeons and two lieutenants of orderlies were at once detached for various duties, and one staff-serjeant, one corporal, and twenty-five privates were sent to the Base Hospital, and fifteen privates to the Field Hospital.

Army Service Corps detached.—There being in the meantime no further use for the detachment of the Army Service Corps with the Bearer Company, it was handed over for service under the Commissariat and Transport Department, on the understanding that it was at once to rejoin in the event of active operations being renewed.

Proposal to utilize Half-Company for Field Hospital.—The Bearer Company being thus reduced to about the strength of a Half Bearer Company, on April 1, I wrote to the Principal Medical Officer, South Africa,[23] suggesting that with it I could, during the continuance of peace, very easily work an auxiliary Stationary Field Hospital, and thus relieve the numbers in the very large Movable Field Hospital, but this proposal was not adopted. Consequently, during the time the Bearer Company remained encamped in the vicinity of Newcastle (from March 25 to November 17, 1881) it was little more than a depot for the Army Hospital Corps, supplying officers, N.C.O.'s, and men as required, and receiving them back when their services were no longer wanted elsewhere.

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frequently necessary in the course of the march to unload a single wagon when it had stuck in a "spruit" or deep mud hole. Some idea of the fatiguing nature of this work may be formed from the fact that the weight of ammunition in each wagon averaged 5,568 lb. The willing spirit evinced by the men on these occasions was most praiseworthy.

[22] Brigade Surgeon Edward Malcolm Sinclair, M.D., now C.B., Deputy Surgeon General, retired, Army Medical Staff.

[23] Deputy Surgeon General Holloway, see footnote 18.

Question of the Necessity for Maintaining a Bearer Company.—I am aware it has been said that this was a great waste of labour, and has been even used as an argument against the very existence of a Bearer Company. But this objection is, I submit, more apparent then real. The conduct of this campaign has been, in the matter of maintaining a large force on a war footing during a six months' armistice, quite unprecedented. No one will argue that the keeping together of any part of the fighting portion of this force was of any use, except with the view to its being prepared to strike the moment it might be required, and it ought to be obvious that under the circumstances it was no less a necessity that the Bearer Company should be maintained, ready to perform its special function if fighting recommenced.

Men ought to have been more interchangeable.—Nevertheless, I consider it might have been made a much more useful institution if a system had been introduced of exchanging, from time to time, the men of the various hospitals with men from the company, so as to give each in turn experience in hospital work as well as an opportunity of keeping up his drill, and maintaining those habits of regularity and discipline which it is so much more easy to inculcate in an organization like a Bearer Company than in a hospital. As it was, for the seven and a half months during which we were detained in standing camp, the men were employed on guards, pickets, fatigues, and drill.

Three Different Camping Grounds at Newcastle.—For the first two days after the arrival of the Bearer Company at Newcastle the Field Force was encamped on the north side of the Incandu River, close to the town of Newcastle, but on March 31 the whole force was moved to an encamping ground on Signal Hill, about 4 miles from Newcastle. Here the force remained until May 6, when it was moved to Bennitt's Drift Camp, which is about the same distance from Newcastle as Signal Hill, but is a far better camping ground. Here the troops remained until the breaking up of the force.

Employment in Standing Camp.—At Bennitt's Drift Camp, in the prospect of a prolonged stay, as much as possible was done to make the men of the company comfortable and to keep them employed. A good-sized hut was built of turf which was roofed with canvas. This formed a good recreation-room for the men, in which they could read papers and books, play various games, and get coffee, cocoa, &c., and also enjoy the advantage of a fire in the cold winter nights. A football was also supplied for the men's outdoor amusements. The men also built a "*laager*" of sods, which was used as a protection to the horses, and was a most useful piece of work. Low walls were built round the tent used as the officers' mess and the guard tent. A very elaborate system of drainage was dug, which rendered the Bearer Company encampment in wet weather the driest one in the camp.

Training of Regimental Stretcher-Bearers.—On April 11, on my recommendation, the Major-General Commanding sanctioned two men per company from each of the Infantry Regiments in camp being trained as regimental stretcher-bearers, and a class of forty men was accordingly put through a very complete course of instruction by Surgeon Major Faris. The course was completed on May 9, when before dismissal the class was inspected by Brigadier-General D. C. Drury-Lowe, C.B.

Transport of Wounded.—On April 20, a party of the Bearer Company, consisting of one non-commissioned officer and thirty men in charge of Surgeon Conolly, conveyed in stretchers from Schuins Hooghte to the Base Hospital, Newcastle (a distance of ten miles), four of the most badly wounded men from the front, an arduous duty which was accomplished with a minimum of discomfort to the patients.

Further Calls for Officers and Men.—Soon after the arrival of the Bearer Company at Newcastle, further demands were made for officers and men for other duties, and for some time only one Surgeon besides Surgeon Major Faris and myself was left with the Company. As the Bearer company had to take its share of camp pickets and also to furnish a guard over the Field Hospital in addition to the quarter guard over the Bearer Company camp, this reduction in the number of officers was too great, as it compelled me to ask Surgeon Major Faris to do orderly duty on alternate days with Surgeon Conolly, a duty which, as it involved visiting the sentries, was certainly not befitting a Field Officer, but one which he very cheerfully accepted on seeing the exigency of the case.

Carbines, &c., Returned into Store.—On May 14, the revolvers, Martini-Henry carbines and ammunition with which the Bearer Company had been equipped on leaving England were, on my recommendation to His Excellency the Major-General Commanding, given in to the Ordnance Store, as no longer necessary.

Preparations for a Renewal of Hostilities.—About the middle

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[1] Afterwards G.C.B., Lieutenant-General.

of October, it being doubtful whether hostilities might not be renewed, everything was arranged for the immediate return of the men of the Army Service Corps, the rejoining of detached officers, non-commissioned officers and men, and the provision of transport animals and stores if the necessity arose. A serjeant and sixteen men of the 1st Battalion of the Welsh Regiment (which had only recently joined the Field Force) were on October 26 attached to the Bearer Company and put through a course of instruction in stretcher drill and bandaging, under Surgeon Major Faris; but as after some appearance of hesitation the Convention was duly ratified, these preparations were forthwith abandoned, and the troops forming the Field Force began to move down to the coast on November 6.

Order to March down Country and convoy Sick.—At last the order arrived for the Bearer Company to march down to Pietermaritzburg, on November 17, and to take with it a convoy of two sick officers, forty-four sick soldiers, besides six details to join their corps at Pietermaritzburg. The strength of the Bearer Company was now made up to two surgeons major, three surgeons, two lieutenants of orderlies, eight serjeants, and 113 rank and file. One of the surgeons detailed to accompany the Bearer Company was Surgeon Robert Drury, M.D.,[25] who having joined on October 5, had been put through a course of instruction and the Principal Medical Officer[26] decided to send him home in place of one of the "trained" surgeons detailed to remain in the command.

Striking Rest Camps.—In addition to the duty of convoying the sick, the Bearer Company was ordered to strike and bring into store the equipment of the Rest Camps at the various posts on the road, which had been established for the accommodation of invalids proceeding from the front to Pietermaritzburg.

Rapid March.—The weather and the state of the roads on the downward march were in marked contrast with their condition on the up journey. The Bearer Company reached Pietermaritzburg on November 30, and having there handed over the sick, which had been augmented by seven men brought from Ladysmith, proceeded next day to Richmond Road camp about eight miles from Pietermaritzburg.

Detention at Richmond Road.—Whilst the Bearer Company was detained at Richmond Road awaiting passage to England, a large number of men were transferred from it and their places filled by men who had served for a longer period in the colony, and the company was made up to its original strength of non-commissioned officers and men.

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[25] Now Lieutenant-Colonel, retired pay, *late* Royal Army Medical Corps.

[26] Deputy Surgeon-General James Sinclair, M.D., afterwards Surgeon Major-General, K.H.P. Died at Belfast, November 21, 1910, when on retired pay.

Company made up to full Strength except Officers.—The Principal Medical Officer decided that the following officers should go home with it—viz., Surgeons Major W. Johnston and T. Faris, Surgeons R. Drury and P. B. Conolly, and Lieutenant of Orderlies W. Pike.

On December 24, Deputy Surgeon-General J. Sinclair, M.D.,[27] then Principal Medical Officer South Africa, inspected the Bearer Company previous to its leaving the command, and was pleased to express himself as much gratified by the appearance of the men and their conduct whilst in South Africa.

On December 28, the Bearer Company proceeded by train to Durban, and on the 30th embarked on board the steamship "Duart Castle" for conveyance to England.

Embarkation for England.—Brevet-Major H. G. MacGregor,[28] the Worcester Regiment, was in command of the troops on board ship, and Surgeon Major Faris was in medical charge.

Besides the Bearer Company there were on board the 7th Company Commissariat and Transport Corps and a number of details. The officers and men of the Bearer Company took their turn of watches, guards, and other duties with the officers and men of other corps.

Arrival at Portsmouth and Aldershot.—The "Duart Castle" arrived at Portsmouth on January 27, and the Bearer Company proceeded by train the same day to Aldershot, when the men were handed over to the Officer Commanding the Depôt Army Hospital Corps.

Thanks due to Various Officers.—In concluding this report I beg to express my deep obligation to Surgeon Major Faris for the never-failing support he has so cheerfully given me on all occasions, and to record the zeal he displayed in training the regimental stretcher-bearers, in experimenting with and reporting on the new pattern cacolets and litters (sent for trial), as well as in the performance of every duty, however irksome, for which he was detailed.

Surgeon Conolly, who acted as my adjutant through the year of the Bearer Company's existence, has, in the manner he performed his duties, satisfied me of the expediency of selecting an officer of the Medical Department for this position, and he has proved that to the qualifications of a good surgeon may easily be added the knowledge required to render one a good executive officer.

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[27] See footnote 26.

[28] Now C.B., Colonel, retired pay.

Surgeon Drury, who, as noticed above, only joined the Bearer Company in October, 1881, has displayed diligence in acquiring a knowledge of his duties and zeal in their performance.

Lieutenant of Orderlies Pike performed his duties of quartermaster to my entire satisfaction.

Much good work (and on the march up country it was most arduous) was also done by the other officers who came out with the Bearer Company, and I only regret that some of the young officers were not allowed to remain longer with it, since I am satisfied the experience they would have gained in dealing with a much larger number of men than is usually found in a detachment of the Army Hospital Corps could not fail to have been useful to them in their future careers.

Efficiency of the Serjeant-Major.—Serjeant-Major N. Ellis has proved himself a most reliable and useful warrant officer, and his excellent tact in dealing with non-commissioned officers and men has been of great assistance in maintaining a high state of discipline in the company.

Conduct of the Non-commissioned Officers and Men.—The conduct of the non-commissioned officers and men has been very good, and I have elsewhere mentioned those who seem to me to specially merit promotion.

Reviews.

A COMPARATIVE STUDY OF METHODS OF EXAMINING FÆCES FOR EVIDENCES OF PARASITISM. By Maurice C. Hall. Washington: Government Printing Office, 1911. Pp. 36, unpriced.

This is the 135th bulletin of the United States Bureau of Animal Industry, and, like all the publications of the Bureau that we have seen, is most interesting and of great value. The author discusses the different methods for detecting parasites and ova in fæces; he has devised a method which saves time and labour and is more accurate than those which are in general use.

He takes 4 to 5 oz. of fæces and shakes them thoroughly in water in a rubber-corked bottle with a wide mouth. Shot may be added to assist in the comminution, or a mechanical shaker may be used. When thoroughly broken up, the fæces are poured through a set of six brass sieves varying in mesh from 3 mm. at the top to about ¼ mm. at the bottom. Ova will pass through, but parasites and vegetable matter will be caught and can be examined. The portions that pass through the finest mesh are then poured on to a screen of "millers' silk bolting cloth," or of No. 120 brass screening with a mesh 0·117 to 0·134 mm.; practically the whole of the ova will pass through this. The bolting cloth is expensive (£1 a yard 18 in. wide) and shrinks to a mesh of 0·070 to 0·080 which is too fine to permit of the passage of several varieties of ova. The No. 120 brass screen costs about 7s. 6d. a square foot and does not shrink. The portions which pass through the fine screen are sedimented with plenty of water in a tall jar, the upper layer being decanted and the sediment washed and centrifuged. Centrifuging should not be prolonged, 4 to 10 seconds with the machine running at 1,230 revolutions a minute being sufficient. A drop of sediment is placed on a slide, covered and examined.

An alternative method which may be used as a check on the first is to use two centrifuge tubes, one being treated as above. The water is poured off from the second and a solution of calcium chloride (sp. gr. 1250) substituted; after centrifuging again, the ova, being lighter than the solution, will be found in the upper layers; a drop of this may be examined direct or a cubic centimetre from the top may be pipetted off, shaken with 14 cc. of water and centrifuged, when a drop from the bottom of the tube should contain the ova.

The writer has tested many methods of examination and finds that the method described above gives the best results. It serves well for the fæces of man, carnivora, herbivora and birds. It is useful for examining fæces not only for worm parasites but also for coccidia.

The bulletin concludes with an excellent bibliography of the subject covering the past ten years. C. H. S.

THE MODERN VIEW OF SYPHILIS AND ITS TREATMENT. By Gustav Barr, M.D. (Vienna). London: D. Appleton & Co. Price 8s. 6d. net.

As he states in his preface, the author has written this book with the object of assisting the general practitioner to diagnose syphilis in its more obscure forms, particularly when affecting the central nervous system, the viscera and the blood, and to emphasize the very great assistance to be derived from the use of the Wassermann test. The first part of the book is devoted to the laboratory diagnosis of syphilis and provides an excellent summary of the experiences of numerous workers with the Wassermann test, though no practical details of the latter are given. It is a pity that in this part the dark ground illumination was not referred to in more detail, and the statement that the *Spirochæta pallida* is "four microns wide" is rather surprising. In the second part an account is given of the special points which assist in the recognition of syphilis when it affects the various viscera, the central nervous system, or the blood, and a number of cases are related to illustrate these points. The cases are described at great length, and much unnecessary detail might have been omitted with advantage, while a number of the histories failed to convince us of the syphilitic nature of the symptoms related. For instance, a case of pernicious anæmia is attributed to syphilis on the grounds of a specific history and a positive Wassermann reaction. In this and some other instances the author seems to have fallen into the error, against which he warns us in the early part of his book, of labelling every lesion syphilitic which coincides with a positive Wassermann reaction, with or without a specific history. While few are more impressed than we are with the enormous importance of the Wassermann test as a diagnostic aid, we are convinced that nothing is more likely to bring it into discredit than allowing the presence of a positive Wassermann reaction to blind us to possible causes other than syphilis for the symptoms which a patient may display. The third part of the book deals with the modern therapy of syphilis, but omits treatment with salvarsan.

L. W. H.

THE EXPERIMENTAL CHEMOTHERAPY OF SPIRILLOSES. By Paul Ehrlich and S. Hata. With contributions by H. J. Nichols, New York; J. Iversen, St. Petersburg; Bitter, Cairo; and Dreyer, Cairo. Translated by A. Newbold, and revised by Robert W. Felkin, M.D., F.R.S.E., &c. London: Rebman Limited. Price 12s. net.

This is a companion volume to "The Treatment of Syphilis with Dioxydiamidoarsenobenzol," which was lately reviewed in this JOURNAL, and, with the latter, forms a complete treatise on this important subject. In the preface, Ehrlich acknowledges the assistance he received from numerous workers, and briefly indicates the scheme on which he organized his research. One is at once impressed with the fact that salvarsan was not an inspiration or a "lucky find," but the inevitable result of such a model research. The first part is devoted to an account of numerous experiments which Hata conducted on animals suffering from experimental relapsing fever, fowl spirillosis and syphilis with the various compounds which Bertheim prepared at Ehrlich's suggestion. The very complete details of his technique which he furnishes will be found most useful by the worker on similar lines, while the results are of surpassing interest even to the more general reader. Nichols contributes a paper on the effect of salvarsan on experimental yaws, while Iversen's and Dreyer's and Bitter's contributions deal with its use in relapsing fever. Ehrlich concludes with remarks which review the whole subject of experimental chemotherapy, answer the criticisms which have been levelled against his preparation, and refer to the indications and contraindications of salvarsan. The whole work is a valuable addition to the literature on salvarsan, and one which will well repay careful study.

L. W. H.

THE DIAGNOSIS OF GLANDERS BY COMPLEMENT FIXATION. By John R. Mohler, V.M.D., and Adolph Eichorn, D.V.S.; being Bulletin 136 of the United States Department of Agriculture Bureau of Animal Industry. Washington: Government Printing Office.

The authors, recognizing the disadvantages of the agglutination, mallein and precipitin tests for glanders, were led by Schütz and Schubert's work to employ the method of complement fixation, and this bulletin is an account of the technique which they employed, with its results. The technique was identical with that of the original Wassermann reaction except in the preparation of the extract or antigen for the test; this was made by washing off the growth of glanders bacilli after forty-eight hours' incubation on an agar slope or in a Kolle's flask, with 5-40 cc. of salt solution, according to the size of the culture surface, heating to 60° C. for four hours, shaking for four days, centrifugalizing for two hours, and, finally, adding 10 per cent of a 5 per cent solution of carbolic acid to the supernatant fluid. The extract was found to keep for three months. In 800 tests they found that 97 per cent of glanders cases gave a positive reaction; in no case did the serum of normal animals or those suffering from diseases other than glanders cause deviation of complement, and they conclude that this method of diagnosis is more reliable than any hitherto employed. The test should be a valuable one in the diagnosis of human glanders.

L. W. H.

RIEDEL'S BERICHTE. Riedel's report.

This is a publication issued by a long-established firm of manufacturing chemists. It contains much useful information concerning remedies the names of which are gradually becoming familiar, and of other more recent and less known preparations. Thus we find descriptions of Adalin, Antiformin, Alypin, Dionin, Fibrolysin, Gonosan, Hedonal, Pantopon, Salipyrin, Salvarsan, Scopolamin, &c. Under each heading we find an account of the action and use of the substance together with numerous references to the literature bearing on the subject.

C. B.

TACTICAL CONSIDERATIONS FOR THE DIRECTOR OF MEDICAL SERVICES OF AN ARMY. (Die operative und sanitatstaktische Tätigkeit des Armeechefarztes.) By Maximilian Ritter v. Hoen, Lieutenant-Colonel, General Staff, and Dr. Marian Szarewski, Regimentsarzt. Pp. 31. 9⅜ by 6½. Safar. Vienna, 1910. Price 1s. 9d.

This work gives a brief review of the duties which have to be carried out by the Director of Medical Services with an army in the field. Some useful points are given to guide him in arranging his scheme for the disposition of medical units in different military situations, but most of the book is devoted to the problem of collecting and evacuating the sick and wounded. An appendix (Militärärztliche Publikationen No. 130) contains four diagrammatic maps showing the distribution of the medical units and the routes by which the sick and wounded are evacuated when the army is on the march, during a period of non-activity, immediately before and after a battle.

C. E. P.

ORGANIZATION OF THE AUSTRIAN ARMY. The Medical Service (*Einführung in das Heerwesen*, 9 *Heft*, *Das Sanitätswesen und das Veterinarwesen*). By Otto Waldschutz, K. u. K. Hauptmann des Generalstabskorps. 8vo. 175 pp. Vienna, 1911. Beck and Sohn.

This, the ninth of the series of introductory manuals published by Captain Waldschutz, deals with the medical and veterinary services of the Austrian Army. The first section discusses the duties and organization of the medical services in general. The next section describes the organization and administration of the medical services in time of peace. The medical service in time of war is similarly dealt with in two sections. The sections, "Orientierende Daten und Details" in peace and war give a great deal of useful information on personnel, equipment and establishments. The figures given have been corrected to include all changes up to December, 1910.

C. E. P.

FIRST AID CHARTS. By Edward C. B. Ibotson, M.B., B.S. No. 1.—Emergencies, Accidents, and Poisoning. 2.—Fractures, Dislocations, and Sprains. 3.—Wounds and Hæmorrhage. 4.—Insensibility or Unconsciousness. Price 6d. each net, or 1s. 6d. net the set of four. Bristol: John Wright and Sons, Ltd. London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd.

These First Aid Charts are very complete and comprehensive. They would be specially useful as a ready reference for men undergoing qualifying courses. Chart No. 1 would be valuable in medical inspection rooms and in dispensaries of small hospitals.

C. K. M.

Current Literature.

Paradoxical Wassermann Reactions.—Rasp and Sonntag (*Deut. med. Woch.*, April 13, 1911, p. 683) have studied the so-called paradoxical Wassermann's reactions, in which a serum at first positive becomes negative after preserving for some days, and *vice versa.* They have made six hundred examinations of two hundred sera. Of these fifty were always positive, though a month might have elapsed since the blood was withdrawn. They were all of syphilitic origin. One hundred and forty-one were always negative on testing. In the majority of these, syphilis could be excluded. Hence, the authors conclude that normal sera never behave in a paradoxical manner. The remaining nine gave somewhat ambiguous readings. It was a remarkable fact, however, that the patients who supplied the blood had either contracted the infection at some distant date and had been well treated, or were in quite the earliest stages of the disease. The authors believe that a paradoxical reaction in the true sense of the word does not occur, but that small differences in technique will cause the serum of these border line cases to be classed sometimes positive and sometimes negative. They assert that the readings will never lead to error if the antigen has been tested against known sera in various dilutions, if the complement, and hæmolytic amboceptor have been accurately titrated, and if the control tubes are satisfactory.

C. B.

The Diagnostic and Prognostic Value of Leucocytosis.—Sonnenburg (*Deut. med. Woch.*, April 13, 1911) has made many thousand leucocyte estimations since 1903 in his surgical practice. He has found that in peritoneal inflammation leucocytosis is much more rapidly produced and is more pronounced than in inflammations elsewhere, hence a count is of much practical use in the diagnosis and prognosis of appendicitis. With Naegeli, he distinguishes: (1) Mild cases with leucocytosis lasting one or two days only, which soon recover. (2) Severer infections with an initial leucocytosis of 20,000 to 30,000 or more. (3) Very severe cases which, beginning with a high leucocytosis, soon give a normal or subnormal count. (4) Malignant infections which present leucopenia from the outset. As soon as pus becomes encapsuled, the number of leucocytes falls to normal limits. New centres of suppuration may be made known by a rise in the leucocyte curve, even when the temperature and pulse give no indication. A differential count is of assistance. The more virulent the disease the greater the percentage of mononuclear leucocytes. An enumeration of the leucocytes is an important aid in distinguishing appendicitis from appendicular colic and colitis, since leucocytosis is absent in the latter two affections. In ileus and post-operative obstruction a count may differentiate between an infection of the peritoneum and paralysis of the bowel. The urgency of the symptoms in gallstone, renal or lead colic often causes the suspicion of acute peritonitis. The absence of leucocytosis, however, may lead to a right conclusion. A quantitative and qualitative leucocyte count gives a measure of the virulence of, and of the reaction of the human organism to, the infecting agent.

Grawitz draws attention to leucocytosis caused by muscular exertion. This is well seen in normal parturition, in which it attains to 20,000 or 30,000. The leucocytosis of whooping cough may be explained by the violent muscular efforts occasioned. Leucocytosis is found in scarlet fever, but not in measles, influenza, or typhoid fever or uncomplicated tubercle of the lungs. In tubercular and syphilitic glandular enlargements the mononuclear leucocytes are increased.

R. Franz states that the number of leucocytes increases to 15,000 after mild gynæcological operations. The severer the operation and the greater the damage sustained by the peritoneum the higher the leucocytosis, so that counts up to 30,000 are not uncommon. If no complication occurs the curve should become normal in four or five days. Leucocytosis is found in hæmatocele, ruptured extra-uterine gestation, as well as in pelvic peritonitis, hence a blood-count is not capable of distinguishing between blood or bacteria in the peritoneum. There is no increase in tubercular affections of the adnexa, and only a slight addition in gonorrhœal, whereas in the streptococcic infections there is usually marked leucocytosis, though this may be absent. Leucocyte estimations may be made very simply by counting the total number in each field. Using a Thoma-Zeiss counting chamber, a thin cover glass, a $\frac{1}{6}$ objective, and a No. 2 eyepiece, the draw tube can be extended so that the diameter of the field is $7\frac{1}{8}$ squares. Then with a tenfold dilution of blood exactly $\frac{1}{1000}$ c.mm. of blood will be the amount in each field. C. B.

The Excretion of Iron in Malaria.—Hueck found that in certain conditions iron exists in the urine in two forms. The metal may be loosely combined and can be split off by treating the urine with ammonium sulphide, or it may be so firmly fixed that it can be isolated only by first destroying completely the organic bodies.

Giemsa (*Arch. f. Schiffs u. Trop. Hyg.*, No. 10, 1911, p. 305) has studied the elimination of iron in the urine of malarial patients. During an ague attack, when parasites are numerous, the amount of loosely combined iron is increased about ten times, while that in firm combination remains the same. A return to the normal ratio is rapid in convalescence, hence the estimation is of no assistance in the diagnosis of latent malaria. The tests are cumbersome and of no value clinically. C. B.

Eradication of Cattle Ticks in Regions Infected with Texas Fever.—MacKellar and Hart contribute an excellent account of the work done by the United States Bureau of Animal Industry (*26th Annual Report*) in the eradication of cattle ticks in California.

The history of Texas fever in California dates back scores of years before the tick was known to be in any way connected with it, and ticks of all kinds are extremely common in the country. When the question of Texas fever came to be scientifically investigated, it was found that a very large part of the State was permanently infested with the fever ticks which had probably been brought across the unguarded frontier from Mexico.

There are two ways in which a range of country can be cleared of these ticks: either all livestock can be removed from the land for a season, so that the ticks, being deprived of sustenance, die out; or the livestock can be dipped in a poisonous solution at such intervals as will prevent the continued multiplication of the ticks. In either case care must of course be taken that the land is not subsequently infected. Previously the cattlemen, on finding that a tract of land was infected with the fever, had removed their herds to fresh land; the infected land became clear, but the fresh land was infected. Owing to the long, unguarded Mexican frontier the problem was rendered more than usually difficult.

It was decided to build a stock-proof fence along the whole frontier and then to have all the cattle persistently dipped until the State was free from the ticks. A State law was passed making it a misdemeanour to move or expose tick-infested cattle in such a manner as to infest other cattle not so infested. This law also provides for the disinfection of cattle as directed by the State veterinarian, and gives the latter power to carry out the work at the owner's expense should the latter fail to do it. Where it was possible to "rest" infected pastures this was done from May 1 to October 1, all cattle, horses, mules and asses being excluded from the land during this period, so that all eggs of ticks on the pasture should hatch at a time when no host would be available for them. In most parts of the State, however, this was not practicable, and the problem resolved itself into one of cleaning the ranges while the cattle were continually grazing on them. It was found that spraying, smearing, and similar means of removing the ticks from the animals were futile, and that the installation of a dipping vat was the first essential to success. Three different forms of these vats are described in the report with full specifications and details.

Experiments showed that dips made from mineral oil were neither effectual nor harmless to the cattle, and an arsenical dip was substituted which is prepared after the following formula:

Arsenic trioxide (white arsenic)	8 lb.
Sodium carbonate	24 ,,
Soap (laundry or chipped)	24 ,,
Pine tar	2 or 3 gals.
Water	500 gals.

Dipping begins in California about April 1, and must be continued at thirty-day intervals until eight or nine dippings have been made; great care must be taken that every single animal on the range is dipped on each occasion, the immersion lasting about twenty to thirty seconds. Animals should always be watered just before dipping, and the dipping, in the case of dairy animals, is carried out immediately after milking.

By this procedure, under careful supervision, a range can be cleared of ticks during a single season.

In many places the cattlemen were averse to the dipping and would not believe in the connection between the tick and the fever, but the fact that ticks spoilt the condition of immune animals, and that tick-infested animals were the first to fail in a drought, induced many to consent to and assist in the work; the discouraging continuance of the ticks after three or four monthly dippings was very trying, but in the end the work has been completed and the whole State has been removed from quarantine and is no longer regarded as being tick-infested.

This fine piece of work in preventive medicine calls for our highest admiration; it was well thought out and skilfully and tactfully carried through. C. H. S.

The Estimation of Total Solids in Milk by the Use of Formulas.—R. H. Shaw and C. H. Eckles. (U.S. Department of Agriculture, Bulletin 134. 1911.) There are many occasions on which the necessity for rapidly calculating the solids in milk arise, so that the estimation by means of formulas has become common. The object of the work carried out by the authors was to find out how far the determination of the total solids by means of formulas and by instruments in common use for finding the specific gravity, was feasible and sufficiently accurate.

The main objects of the investigation reported were:—

(1) To compare the percentage of total solids calculated by means of certain formulas in general use, such as those of Richmond, Babcock and Fleishmann, with those obtained gravimetrically in the laboratory.

(2) To test under more exacting conditions the formula which yields results closest to gravimetrically determined total solids, and

(3) To devise a new or modify an existing lactometer with which the specific gravity may be more accurately determined.

For these determinations the specific gravity and percentages of fat and total solids of the milk of twelve cows of four different breeds were examined through one entire lactation period, the results being compared with formulas which are given in a series of well-arranged tables.

It was found that in the case of every cow, regardless of breed or individuality, the Babcock formula yielded results closest to those obtained by gravimetric determination of the total solids. Having found the formula best adapted for the purpose the next step was to determine whether the ordinary lactometers in general use were sufficiently accurate. Thirteen lactometers were available for comparison, eleven of these being of the Quevenne type. Quevenne degrees are converted into specific gravity by dividing by 1,000 and then adding 1 to the quotient. The figures given on Table 6 show discrepancies which are sufficient in some cases to account for as much as 1 per cent of total solids calculated from the Babcock formula. Much of the fault lies with the manufacturer in not properly calibrating the instruments. The want of sensitiveness of the hydrometer, or lactometer, depends upon the ratio of the size of the bulb to the diameter of the stem. The larger the bulb is in proportion to the diameter of the stem, the more sensitive will be the lactometer; or, in other words, the larger will be the spaces representing units on the scale. The authors have designed a lactometer which, when compared with results obtained by the Westphal balance, gave practically identical results. The points taken into account were: (1) That it should accommodate the usual ranges of normal milk; (2) that it should have scale divisions representing tenths of Quevenne degrees; and (3) that it should be neither too fragile nor too cumbersome for practical use outside of a chemical laboratory.

A section is devoted to describing the use of the modified lactometer with a table and directions for determining total solids in milk from any given specific gravity and percentage of fat. The bulletin concludes with the following summary and some very useful tables for the comparative determinations of total solids in milk.

(1) For purposes where exact percentages of total solids are demanded the use of any formula will not fulfil the requirements.

(2) Of the formulas in general use that known as the Babcock (revised) formula gave results closest to those obtained gravimetrically. In 430 composite samples analysed for total solids 256, or nearly 60 per cent, when calculated with this formula agreed within 0·25 per cent of the figures obtained gravimetrically, and 389, or over 90 per cent agreed within 0·50 per cent. In another test with eighty-four samples of milk obtained from four individual cows under official testing conditions, determinations made on each milking showed that the total solids calculated by the formula in fifty-three cases or 63 per cent of the total, agreed within 0·25 per cent of the gravimetrically determined figures, and in seventy-eight cases, or 93 per cent of the total, they agreed within 0·50 per cent.

(3) Neither individual peculiarities nor breed in the cows seemed to exert any notable influence upon the application of the formulas.

(4) The Babcock formula may be safely used with normal milk where only comparatively close approximations are required. It must be left to the decision of those in need of such figures as to whether or not the formula will fulfil their particular requirement.

(5) The lactometers in common use for determining specific gravity of milk are not sufficiently sensitive to be used in connection with the Babcock fat test for estimating total solids in milk by formula.

A modification of the Quevenne lactometer was, however, devised which was found to yield results quite as accurate as those obtained with the Westphal balance. It is so constructed that it may be used successfully by those unskilled in the use of chemical apparatus.

W. W. O. B.

Tubercle Bacilli in Milk and Milk Products.—Campbell, Mohler, and others, working for the United States Bureau of Animal Industry (Twenty-sixth Annual Report), have investigated the methods for the detection of tubercle bacilli in market milk, and the question of the viability of this bacillus in butter and cheese.

The technique used to determine the presence of tubercle bacilli in milk was as follows: 10 cc. of a thoroughly mixed sample was placed in each of three centrifuge tubes by means of a sterile pipette, and the tubes were run in an electric centrifuge for thirty minutes at 1,200 revolutions a minute. The tubes were then taken out and the cream removed on a sterile wire loop and placed in a sterile crucible, and sterile water added to bring up the volume to 3 cc. The milk in the tube was then drawn off down to the 1 cc. mark, and the remaining 1 cc. of sediment placed in another sterile crucible. Smears were made and examined microscopically.

Three guinea-pigs were then inoculated subcutaneously, one with 2 cc. cream emulsion, one with 2 cc. sediment, and the third with 1 cc. cream emulsion and 1 cc. sediment. The animals were observed for two months, and those still alive at the end of that period were chloroformed and an autopsy made. One hundred and thirty samples were taken; in seven cases all the animals died before the symptoms of tuberculosis had time to develop, of the remainder eighteen were tuberculous.

In most of the cases where one of the set of three guinea-pigs inoculated from a single sample developed tuberculosis it was the one inoculated with the cream that suffered, but this was not invariably the case, and the triple inoculation seems to be advisable. Many of the animals died of septic peritonitis. In only one case were tubercle bacilli found microscopically in the smears made from the milk; in this case only two guinea-pigs were inoculated—one with the cream, which died in five days from septic peritonitis, and one with the sediment, which had developed no lesion when killed on the sixtieth day.

Milk bought as "Pasteurized' was examined in the same way, and two samples out of twenty-four were found to contain virulent tubercle bacilli. Milk pasteurized under supervision was, however, found to be free from infection.

A further series of experiments was made to determine the viability of tubercle bacilli in butter and cheese made and kept under ordinary trade conditions. Five samples of butter were specially prepared from milk containing tubercle bacilli, in three cases from cows suffering from marked tuberculosis of the udder, and in the remainder from laboratory cultures: four samples contained an ounce of salt to the pound, but the fifth was left unsalted. The different samples were tested on guinea-pigs, both by feeding and by inoculation, after the butter had been kept in cold storage for various periods, viz., ten days, thirty days, three, six, and nine months. The results were very irregular, showing that the distribution of the bacilli, even in the naturally infected milk, must be very uneven; four of the five samples were infective at the end of three months, but none gave rise to infection at the end of nine months' storage. Four of the five samples gave rise to no infection at the end of thirty days, but there was only one, an artificially contaminated milk, that did not do so subsequently.

The authors conclude that no reliance can be placed on the addition of salt or on cold storage up to six months as a means of rendering harmless butter made from tuberculous milk. The most satisfactory way of removing the danger is the application of the tuberculin test to all cows that supply milk for dairy purposes, and the subsequent removal of all beasts which react to this test. Where this cannot be done recourse may be had to Pasteurization, as it has been found that subjecting cream to a temperature of 140° F. (60° C.), for a period of twenty minutes, or of 176° F. (80° C.) momentarily, will effectually destroy all the tubercle bacilli that may have found lodgment in it.

Similar experiments were made with cheese specially prepared from infected milk, and guinea-pigs were infected both by feeding and by inoculation after the cheese had been kept in cold storage for 261 days.

Investigations on the mycology of cheese-making are being carried out, and it is hoped that it will soon be possible, by means of laboratory cultures, to manufacture cheese of any description from Pasteurized milk. C. H. S.

Report on Smallpox and Vaccination.—By Lieutenent-Colonel C. E. Woodruff, Medical Corps, U.S.A. (*extract from The Military Surgeon*, vol. xxix. No. 1). As a result of twenty years' experience and investigation Lieut.-Colonel C. E. Woodruff has formed the following conclusions:—

"(1) One good vaccination in infancy in three places on each arm as done in Europe, generally, but not always, causes a lifelong immunity in both vaccinia and smallpox.

"(2) In cases which can be re-vaccinated, or which take smallpox after one vaccination, the original operation as shown by the scars was not thorough as a rule.

"(3) There are no cases of smallpox on record after two undoubted vaccination successes, one in infancy and one in adult life, or even two in adult life at wide intervals. Many have been reported, but careful investigations failed to show scars of two different periods or showed poor ones. Even in those very few recorded cases where the physician himself has been convinced that the scars showed more than one perfect vaccination, we are now justified in doubting the accuracy of the observation or of the patient's previous history, as the cases are so few compared to the billions who have retained immunity. They are explainable as instances of a long interval since one success. Until there are more accurate records of this interval we must accept the generalization that two successes protect for life. At least they do in the Army so far as twenty years of observation go. An exceedingly common mistake is to consider a vaccination successful when, in fact, it was a mere inflammation due to pus organisms always on or in the skin, and sometimes in the lymph. Another error is to consider "spurious" or "aborted" cases successful, where the vaccine organisms begin to grow but are too feeble to continue or if potent are killed by the immunity of a prior vaccination. All such cases must be called failures. They are much to blame for the also idea that vaccination does not protect. I can find no evidence that immunity wears out faster in the tropics than at home; the cases of smallpox here merely mean that we encounter infection more frequently, though, of course, a man otherwise wholly immune may be "run down" and more liable to any infection which he would resist if vigorous.

"(4) There are no persons immune to primary vaccination and failure means dead lymph, improper application or removal of the live virus.

"(5) If an adult has two or more good normal scars from infancy, and a proper vaccination fails, he should be considered an immune, but in view of the few whose vaccinations were not thorough and whose immunity wears out, it is wise to repeat it until a second does succeed, but not oftener than every three years.

"(6) If an adult has good scars showing two successful vaccinations, one in infancy and one in adult life, or both in adult life, he should be considered an immune for life, and excused from further operation."

The Determination of Nicotin in Nicotin Solutions and Tobacco Extract.—U.S. Department of Agriculture, Bureau of Animal Industry.

(*Bulletin* 133.) This bulletin is concerned chiefly with the methods of determining the amount of nicotin in tobacco extracts generally used for exterminating certain species of insects infecting plants and animals.

The author shows that the silicotungstate method has advantages over the Kersling and the petroleum ether method, besides being more accurate, excelling in convenience, simplicity and rapidity. From data of experimental work the author offers some codified directions for the routine execution of analysis by the silicostungstate method which undoubtedly presents one of the best methods at our command at the present time for carrying out a somewhat tedious analysis with comparative ease. W. W. O. B.

Quinine and its Salts: their Solubility and Absorbability.—By Captain A. C. MacGilchrist, I.M.S. (Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India. No. 41.)

SUMMARY OF CHIEF RESULTS AND CONCLUSIONS.

Solutions of Quinine Salts and Moulds.—The sulphate is not the only salt of quinine that is liable to infection with moulds, and the moulds which infect solutions of quinine salts are not limited to the genus Penicillium. Quinine is not so inimical to the higher fungi as to the lower yeast forms.

Miscibility of Quinine Salts with Ox Blood-serum.—The salts of quinine most soluble in water, even in a dilution of 1 in 100, are not miscible with ox blood-serum. The three salts, quinine bi-hydrochloride, quinine bi-hydrobromide and quinine urea, most frequently employed, mixed with an equal volume of ox blood-serum, in a few minutes at 17° C. result in the formation of a solid gelatinous mass. Quinine bi-hydrobromide even in a dilution of 1 in 20 produces a mass of curdy consistence. Quinine salts in the dilutions usually employed are quite unsuited for hypodermic use. The deposit which forms *in vitro* on adding a concentrated solution of quinine salt to blood-serum seems to contain quinine in altered form, oxidized and combined with proteid. Mixing equal volumes of blood-serum and quinine hydrochloride 1 in 20, it is found that slightly over half the quinine is in solution and slightly under half is contained in the deposit. The greater the dilution of quinine salt, the less the deposit that forms on mixing with blood-serum, and therefore presumably the greater the amount of quinine that remains in solution.

Solubility of Quinine Alkaloid in Ox Blood-serum and in Ox Bile.—Quinine alkaloid is soluble 1 in 625 of ox blood-serum, i.e., nearly three times as soluble in ox blood-serum as in ordinary water. Quinine alkaloid is soluble 1 in 183 of ox bile, i.e., about nine times as soluble in ox bile as in ordinary water.

Absorption of Quinine.—Too much reliance must not be placed on the amount of quinine elimination in the urine as a gauge of the amount of quinine absorbed, especially when different modes of quinine administration are being compared. Lethality varies directly with thoroughness of absorption and is a reliable measure of the amount of absorption when comparing different modes of quinine administration.

Oral Administration.—Under ordinary circumstances, most of the quinine administered by the mouth is absorbed from the small intestine; a small amount possibly from the stomach, especially if administered while fasting and in the form of a salt easily soluble in water, and also a relatively small amount from the large intestine.

Affections of the gastro-intestinal tract and liver have a marked influence on the amount of quinine absorbed, as have also the food contents of the gastro-intestinal tract and the degree of solubility of the quinine salt employed. Absorption is retarded if quinine is given with or soon after food and also if the less soluble preparations of quinine are administered. Rapid and energetic absorption is best obtained by giving a soluble quinine salt during fasting, gradual and prolonged absorption is attained by giving one of the less soluble salts of quinine with or soon after meals, absorption under such conditions being maintained at a considerable level for some eight hours. Hence, where sporulation is regular, a soluble quinine salt should be given, during fasting, two or three hours before a paroxysm; in other cases, one of the less soluble preparations of quinine, with or soon after meals, every eight hours. Carbonic acid, like bile, probably plays an important part in the process of quinine absorption.

The administration of soluble quinine salts in capsules is bad: gastric irritation and trouble may follow. Where quinine causes gastric irritation, the least soluble salts of quinine, e.g., tannate, should be given.

Large doses, e.g., 15 gr. three times daily, give better therapeutic results than fractional doses, e.g., 4 gr. every two hours day and night. In cases where quinine by the mouth does not produce the desired effect, attention should be directed to the condition of the gastro-intestinal tract and liver.

Subcutaneous (including intramuscular) Administration.—Quinine salt solutions in the concentration usually employed for hypodermic injection when mixed with blood-serum produce a coagulum which contains quinine in altered form.

Quinine is precipitated at the seat of injection and over 66 per cent of the amount injected intramuscularly has been recovered seventeen hours afterwards from the muscles at the site of injection. The amount of quinine eliminated in the urine after this mode of administration varies between wide limits.

Urethane, antipyrin and sodium chloride, although they increase the solubility of quinine hydrochloride in water, do not increase the miscibility of that quinine salt with ox blood-serum, and the new compounds formed in such solutions are of doubtful therapeutic value.

As regards guinea-pigs, the lethality (and therefore absorbability) of quinine by the several modes of administration is in the following order, beginning with the most lethal mode of administration: (1) Subcutaneous injection in extreme dilution (1 in 150); (2) oral administration during fasting; (3) oral administration with or immediately after food; and (4) subcutaneous injection in the strengths generally used for hypodermic injection (1 in 2 and 1 in 8). The oral administration of quinine also affords more prompt therapeutic action of the alkaloid than does the subcutaneous, the subcutaneous injection of quinine in extreme dilution (1 in 150) being excluded for clinical reasons. Further, subcutaneous injections are followed by various complications and mutilation. Intramuscular injections are attended by the same drawbacks as subcutaneous proper, and although ulceration rarely occurs, they are more liable than the latter to be followed by thrombosis and paralysis.

The harmony between the results of various observations on man and those of my experiments on guinea-pigs justify the inference of general applicability, that subcutaneous and intramuscular quinine injections, in solutions of the usual strength (1 in 1 to 1 in 10), are inferior to quinine by the mouth in rapidity of action and thoroughness of absorption, and that they are liable to be attended by grave complications, mutilation and dangers. Quinine and its salts are, moreover, fundamentally unsuited for hypodermic use. This mode of quinine administration should therefore be abandoned.

Intravenous Injections of Quinine.—Great dilution (at least 1 in 50) is necessary in order to avoid the dangers special to quinine. The quinine, e.g., 7 grains of quinine bi-hydrochloride, should be dissolved in two or three pints of saline. This mode of administration is called for in cases of emergency—e.g., pernicious malaria with coma or other cerebral symptoms; and in such cases this extreme dilution affords the additional advantage of attenuating the toxins and favouring their elimination. In this dilution intravenous injections of quinine are quick and sure; and, judging from the subsequent quinine elimination in the urine, their action is not fleeting, they are attended by no risks peculiar to quinine, but merely by those attendant on intravenous infusions generally.

Quinine alkaloid itself, instead of one of its salts, should be used where there is any tendency to or fear of hæmoglobinuria; the alkaloid delays hæmolysis, its acid salts are powerful hæmolytic agents. A solution of the alkaloid can be obtained rapidly and easily for intravenous infusion by first dissolving the alkaloid in a minute amount of absolute alcohol and then adding normal saline to make a solution of 1 in 2,000, or 5,000.

Intravenous injections of quinine alkaloid dissolved in 33 per cent alcohol (in saline) in a strength of about 1 in 135, have been made quickly and safely given in rabbits, and without any subsequent ill-effects, the amount of quinine in the injections being equivalent to doses of 32½ gr. quinine alkaloid to man.

Rectal Administration.—Quinine enemata are very irritating and are generally quickly returned; they are of little therapeutic value in malaria, as comparatively little quinine is absorbed even when retained sufficiently long. The addition of bile or carbonic acid might increase their therapeutic action. Salts of quinine which are not easily soluble in water should be avoided. Hitherto, the best results have been obtained from quinine hydrochloride in water (1 in 50) with tincture of opium or belladonna, or cocaine, injected high up in the bowel, which has been previously washed out with a simple enema. Even under the most favourable circumstances, with sufficiently long retention, we cannot expect as much from quinine enemata as from quinine by the mouth. Quinine suppositories are irritating and useless in the treatment of malaria.

Notes on an Epidemic of Beri-beri and Scurvy.—By Dr. Couvy (*Annales d' Hygiène et Méd. colon*, No. 1, 1911). The epidemic occurred at

Akjoucht, a small post established in Mauretania in 1908. The garrison, consisting of 11 Europeans and 150 natives, was living under favourable hygienic conditions and was well fed. The natives were in receipt of the ordinary field ration comprising 500 grm. of rice, 500 grm. of fresh meat and salt 15 grm. daily; in addition most of them were able to obtain sugar daily. The Europeans also had their full rations, which included fresh meat and wine daily.

The water supply was plentiful and obtained from deep wells.

Analysis of the water: on evaporating one litre a residue of 1·4 to 1·5 grm. was left; this consisted of lime, potassium and manganese salts and effervesced on the addition of weak acids. Chlorides calculated as NaCl varied between 0·688 grm. and 1·630 grm. per litre. The only unsatisfactory feature from a hygienic point of view was the saline character of the water which had been consumed by the garrison since January, 1908.

HISTORY OF THE EPIDEMIC.

Natives.—The first indication of the epidemic occurred on May 17, when a detachment of 50 trained men were unable to complete an easy march, having 30 stragglers. On May 23, 4 riflemen reported sick with beri-beri. By June 4 there were twenty cases under treatment, and next day another twenty-four had to be admitted for the same disease.

On June 5, several of the patients presented undoubted signs of scurvy and from this time onwards the incidence of the two diseases was fairly equal and in many cases patients suffered from both concurrently. By June 17, 124 men out of the 150 in the native detachment were under treatment for beri-beri or scurvy, or both; on August 15 only 5 men out of the 150 were fit for duty.

Europeans.—At the beginning of June, 4 of the Europeans showed early signs of scurvy. On July 21, 9 out of the 11 Europeans were suffering from scurvy. Among the Europeans the symptoms were purely those of scurvy, and there was nothing to suggest beri-beri.

Owing to failing health Dr. Couvy soon had to give up microscopic work, and was therefore unable to continue his observations.

Examination of the blood merely showed a mild degree of anæmia; beyond the ova of tapeworms nothing abnormal was found in the stools.

In the urine of three patients who were passing blood, ova of the *Bilharzia hæmatobia* were found. The excretion of chlorides was diminished, the daily quantity varying in different patients from 1 to 6 grm.

Beri-beri.—Diet: When the first cases were diagnosed the ration of rice was stopped and biscuit substituted. This change of diet produced a rapid improvement in the symptoms.

Unfortunately the quantity of biscuit and flour available at the post did not permit of the whole garrison receiving it in place of rice, but this was carried out in each of the early cases till the supply became exhausted and rice had to be issued again. This was followed by relapses among the patients who had been recovering while on a biscuit diet.

The millet supplied for feeding the horses was then issued in place of the rice. This was followed by a slow improvement in the condition of the sick. On July 1, the supply of millet was exhausted and rice had to be issued again. The small quantity of flour left over was issued to the more serious cases with most beneficial results. The supply of flour was so limited, however, that as soon as convalescence began each patient had to be put back on rice again. A convoy bringing biscuit and millet was held up by the enemy. The supply of fresh meat failed on July 13, and that of preserved meat on August 3. The only available food was rice boiled in water.

On August 16 a small quantity of millet was received. On August 23, a relief convoy bringing biscuit and millet arrived at the post. From this time onwards no more rice was issued, and the health of the garrison rapidly improved. During the epidemic there were five deaths.

A small quantity of rice was received on June 6. This had been roughly husked by native methods and stored in sacks; it had been about three months on the road from the Soudan. This rice was substituted for the government ration rice issued in soldered-up tins, but did not appear to effect any improvement, as the number of sick continued to increase rapidly while it was being used.

It is difficult to account for the occurrence of scurvy among the Europeans, as these were all fit and drawing their full rations, which included fresh meat daily. Between May 14 and July 14, preserved meat was issued only ten times in place of fresh. The incidence of scurvy ceased with the end of the hot dry weather, during which a large quantity of water was being consumed, and the water in the wells being very low contained an excess of mineral salts. On August 16 a violent rainstorm occurred during which several barrels of rain water were collected. This water was given to the patients suffering from scurvy; an immediate improvement was observed in their condition.

C. E. P.

Correspondence.

DEFENCELESS CONDITION OF THE TERRITORIAL MEDICAL UNITS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—There is, I think, a very important matter, which specially affects the Territorial Branch of the Corps, and which has been very forcibly brought to notice during the recent strikes, and that is the absolutely defenceless condition of the medical units.

These units are charged, not only with the care of the wounded, but as matters have recently shown they will have to protect them, as there is no question that the mobs which have been pillaging, &c., during the recent strikes, will be no respectors of our distinguished emblem, unless the Corps is capable of defending itself, if attacked.

Of course during war, theoretically a certain number of men would be detailed from the nearest combatant unit, but with the small number of men at their disposal, the authorities will require every man they have either for actual service in the field, or for guarding the long lines of railway and other important strategic positions, light stations in all towns, &c., and will, when the time does come, find that they have no men at all to detach for guarding the hospitals, &c., as it is only right that the lines of communication should, and must, be defended at all costs.

How then are these units to defend their wounded? For if such things can take place as we have recently witnessed when we are at peace, they will be a thousand times worse when we are at war, and when starvation and the absence of most of our regular troops are also factors in the situation.

It seems to me that the only way to deal with the problem is to arm the *personnel*, and I would suggest for this purpose the short rifle, or the discarded cavalry carbine and a bayonet; the carbine would be quite sufficient, as the latest pattern weapon is not required, but it must be one taking service ammunition. There are probably nearly enough of the latter pattern weapon in stock to go round.

As far as the field ambulances are concerned, during their actual work in the field, the arms could be piled at the dressing-station or other convenient place.

As far as the general hospitals are concerned, the question is far more urgent, as they will be in the very centre of all the troubles, but I personally think that all the medical units should have armed personnel, so that they could protect those under their care, and also it would save a tremendous amount of worry and anxiety to the authorities, as they would then know that these units could be left to look after themselves in case of emergency, and that all their other men would be available for the other and more important duties as I have stated above.

The Geneva Convention evidently foresaw this state of affairs, as it distinctly states that the personnel of the medical units may be armed, and may use its arms for the defence of its wounded. Our Corps now does almost everything for the men it takes charge of, except protect them if they are attacked; surely it might with great advantage to all concerned add this to its duties, and so relieve others.

The amount of time required to train the men would not be much, as they would not be required to be expert marksmen.

The argument that it would take men from their duties, cannot I think be used, as the fact that the unit was armed would probably be sufficient to render it free from attack, and, even if it were attacked, the men would be away from duty for a short time only—probably a volley would settle matters; and, supposing even the small guard from another unit was present, if the medical unit were attacked its personnel would have to turn out as well, to help this guard, so they might just as well be responsible altogether.

Lastly, I am sure it would be popular with the men of the Territorial Force, and would be a factor in encouraging recruits; this last is, I know, the least important part, and pales in importance when the other and more important part of the question is considered.

I should be most interested to hear what regular officers have to say on this point, and must apologize for taking up so much room in your valuable JOURNAL.

I am, &c.,
GEORGE R. BIGGS,
Major, R.A.M.C. (T.F.).

30, *Harley Street, W.*

PARATYPHOID FEVER IN SOUTH AFRICA.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I have just read the papers of Colonel R. H. Firth, and of Major Grattan and Captain Wood, on "Paratyphoid Fever in India," in the August number of the JOURNAL. In both papers it is stated that I claim that, in South Africa, the causal organism in paratyphoid fever is *Bacillus paratyphosus* B. I have carefully looked through my paper on "Paratyphoid Fever in South Africa," which appeared in the May number of the JOURNAL, and cannot find that I made any such assertion. I stated that Major Statham had found in an extensive series of blood cultures made at Pretoria, that 25 per cent. of the cases of continued fever investigated were "paratyphoid fever." A reference to Major Statham's papers in the JOURNAL and *Transvaal Medical Record* will show that he has isolated from the blood both *B. paratyphosus* A and *B. paratyphosus* B, besides allied organisms corresponding to neither type.

Personally, I have not isolated *B. paratyphosus* B from the blood in any case of fever in South Africa. I have twice isolated it from the urine.

As regards diagnosis by agglutination tests I have only ventured to diagnose paratyphoid fever when I either obtained no reaction with *B. typhosus* and a good reaction with *B. paratyphosus* B, or when the reaction with *B. paratyphosus* B occurred in a much higher dilution than that with *B. typhosus*. In seven such cases there was no reaction with *B. typhosus* in $\frac{1}{30}$ dilution in one hour, while a complete positive reaction was obtained with *B. paratyphosus* B in $\frac{1}{60}$ dilution in one hour. I have never obtained a positive result with *B. paratyphosus* A even in $\frac{1}{30}$ dilution. I may say that on talking over this matter with Dr. Robertson, Bacteriologist for Cape Colony, he told me that he frequently obtained positive reactions with *B. paratyphosus* B, but only very rarely with *B. paratyphosus* A.

In the latter part of my paper I described a disease which has been regarded as paratyphoid fever, but which I consider is a distinct disease. This conclusion has also been come to by clinical observers of much experience in South Africa. The temperature chart of a typical example of this fever differs from the chart of paratyphoid fever in Major Grattan and Captain Wood's paper in that the rise of temperature is more sudden and resolution is by crisis. The rash is striking and distinctive.

I think that the misapprehension in regard to my statements is probably due to some ambiguity with reference to the line on p. 507, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, August, which reads: "In South Africa the relative proportion of cases is quite different." This refers to the relative proportion of cases of enteric fever and paratyphoid fever, not to the relative proportion of cases of infection due to *B. paratyphosus* A and *B. paratyphosus* B. When I wrote my paper I was under the impression, from a reference to the latest Army Medical Department Reports at my disposal, that paratyphoid fever was uncommon in India.

I am, &c ,
J. G. McNAUGHT,
Major, R.A.M.C.

Wynberg,
August 30, 1911.

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Journal
of the
Royal Army Medical Corps.

Original Communications.

THE WORK OF DIVISIONAL MEDICAL UNITS IN THE FIELD.[1]

By COLONEL T. P. WOODHOUSE.

THE first portion of the lecture consisted of a short account of the Special Medical Manœuvres conducted at Salisbury Plain in August last year. The instruction contained in this part of the lecture consisted mainly of a description of

(*a*) The duties of the Administrative Medical Officer of a division.

(*b*) The preparation of orders and messages.

(*c*) The organization and duties of the medical detachment with the advanced guard.

(*d*) The duties of field ambulances in taking up their position on the march from the area of concentration.

It is not considered necessary to reproduce this portion of the lecture, as the official account of the Medical Manœuvres has since been issued.

The second portion of the lecture is herewith detailed:—

I presume, indeed I am assured, that you are all well acquainted with what is written on the subject of the duties of the Medical Service in the Field contained in chap. x, Field Service Regulations, part II. I am now going to review those duties in the collecting zone only, and suggest certain reforms which I believe would increase the efficiency of the units engaged therein. I want you to understand that what I am going to say is quite unofficial, and is simply my own personal view on the subject.

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[1] The *précis* of a lecture delivered at Royal Army Medical Corps Staff Tours held in Fifeshire, May, 1911.

I propose to discuss the following points :—

A. Personnel, duties and equipment of—
  (i) The medical establishment with units.
  (ii) The field ambulances.
B. Communication in the field.
C. The auxiliary transport supplied by the Army Service Corps.
D. The organization and functions of a clearing hospital.

A. (i) THE MEDICAL ESTABLISHMENT WITH UNITS.

The Personnel and their Duties: As you well know, the *personnel* of the medical establishment with units is composed of one medical officer, one corporal and four privates, Royal Army Medical Corps (for water duties), one non-commissioned officer and sixteen regimental men as stretcher-bearers, and two orderlies (regimental) for the medical officer, one of whom drives the Maltese cart or leads the pack animal. I have advisedly not included the regimental sanitary detachment, as they would not be used in rendering medical assistance in the field.

(1) You know what are the duties of the medical officer and the stretcher-bearers—they render first-aid to the wounded; this usually consists in applying the first field dressing, arresting hæmorrhage, and furnishing supports for a broken limb. This is all they can do as regards the wound itself. They then, when opportunity offers, carry wounded not able to walk to suitable cover, and direct cases able to walk to a post selected for them. In addition, it is their duty to throw up shelter for cases that are too seriously wounded to be moved.

(2) We will now look at the duties of the regimental orderlies. How would they be employed in battle, and what training do they receive for it? One of these is usually a lance-corporal, and should carry the surgical haversack—the man who drives the cart has not, as far as I know, had any duties assigned to him when he is not doing so. You will see shortly, when I discuss the field stations of the regimental medical establishments, what I propose to do with him. What have you been doing to train these men? I address this question particularly to officers of the Territorial Medical Service. I will tell you what we have been doing in the regular army in the Scottish command. In each unit, the men who would have to carry out these duties in war have been specially

selected—the corporal receives daily instruction in minor surgery, &c., as he is employed in the medical inspection room of his unit, and he would be very useful in war. The man who drives the Maltese cart has been trained in transport duties, looking after animals, keeping harness in order, &c. Any further training for him is not considered necessary.

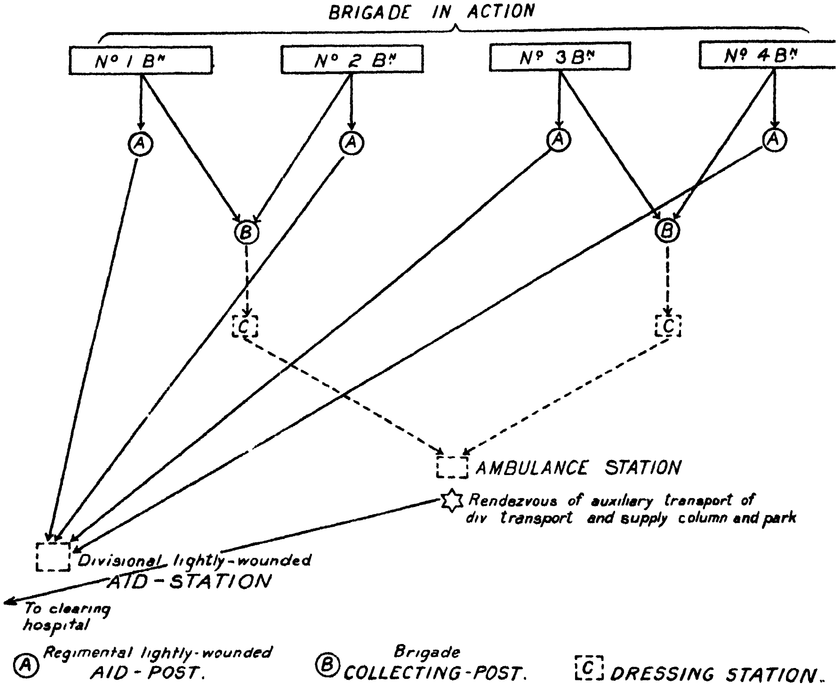
(3) The employment of the N.C.O. and four privates, Royal Army Medical Corps in an action is rather a vexed question. They are, as you know, primarily intended for water duties, and it is argued that under no circumstances should they be taken from this important work. My answer is, that every such consideration must give place to the exigencies of battle. Moreover, you must remember that water-carts are at present second line transport, and would be far away from the battlefield, and the services of these men would be lost to the battalion. I will shortly tell you how I propose to employ them.

There is one other point I should like to draw your attention to, and that is the manner in which the regimental stretcher-squads should work. This should be done in an organized way, each squad being given a definite area in which to operate; if you do not do this you will find that they go wandering aimlessly about, and much time is lost thereby.

A very important subject regarding the first line of medical assistance is the formation of regimental or brigade field stations for wounded. There are certain cases of wounded that can walk from the battlefield, and others which have to be carried. I propose that a separate field station should be established for the former, and be named the "Regimental or Brigade Lightly-Wounded Aid-post," and that the latter be grouped at a station to be named the "Regimental or Brigade Collecting Post." I will more fully describe how I think these stations should be organized (see diagram).

The Lightly-wounded Aid-post.—It should be established at some well-defined spot, separated by some natural feature of terrain from the collecting post, sheltered from rifle fire, and its location notified to regimental commanders and company officers. One for each regiment would usually be established. I am now going to take the advantage of impressing upon you that one of the most important duties of the medical service in the field can here be accomplished, and that is, to return to the firing-line as quickly as possible every wounded man who is able to fire a rifle. It is difficult, unless you have had practical experience, to realize what large numbers of men are lost to commanders in the field by want of a system which, I believe, will be initiated by the establishment of this station. Auxiliaries to this system should exist further to the rear, and will be hereafter mentioned. Many wounded men feel faint and "shaky" when the wound itself is really a very trifling one. This condition of shock is frequently not at all commensurate with the gravity of the wound. You may see a man with a wound of the hand in an advanced state of shock, while a man with a penetrating wound of the abdomen may exhibit none—it depends largely on the nervous organization of the individual. You will find that a man, faint from a trivial wound, after a little rest and a dose of sal-volatile or a feed of Bovril, can quickly return to the firing line. I think that it is the duty of army medical officers to explain to all ranks of the army that there is nothing particularly dreadful about a gunshot wound, because you will find there is a prevalent idea among soldiers that

Diagram to Illustrate Proposed Field Stations.


BRIGADE IN ACTION
Nº 1 Bn
Nº 2 Bn
Nº 3 Bn
Nº 4 Bn
A
B
C
AMBULANCE STATION
Rendezvous of auxiliary transport of div transport and supply column and park
Divisional lightly-wounded AID-STATION
To clearing hospital
A Regimental lightly-wounded AID-POST.
B Brigade COLLECTING-POST.
C DRESSING STATION.

Approximate distance from fighting line to :—
Ambulance station = 3 miles. Divisional lightly-wounded aid-station = 6 miles.
Clearing hospital = 12 miles.

it is likely to lead to "blood-poisoning." A large proportion of gunshot wounds, provided they do not break up bone or destroy blood-vessels, are not very much worse in their after effects than pin-pricks, less so than a prick with a dirty pin, as a modern projectile, impelled from the rifle with enormous velocity, is more or less sterilized. I will give you the following example: A soldier, wounded at Talana Hill at extreme range, came under my care at Durban; the bullet had passed right through his body, from behind forwards; as it left the body its velocity had apparently become expended, and the man's waistbelt had been sufficient obstruction to its further passage—it had lain on the man's bare abdomen, and left a burn of the first degree of the exact shape of the bullet—that will show you that it must have been nearly red-hot when it left the muzzle of the rifle. With this digression I will return to my description of the post.

From this post others, more seriously wounded and not likely to recuperate quickly, but able to walk, should be directed to the "Divisional Lightly-wounded Collecting Station," which I shall describe hereafter.

As to the *personnel* and equipment of the "Lightly-wounded Aid-post" I suggest that the N.C.O. and one private, Royal Army Medical Corps, water duty man, be located here, together with the orderly, who in ordinary times drives the Maltese cart; the latter, of course, having taken steps to secure his horse. The equipment necessary would be the field medical companion, water-bottle and means of providing hot Bovril, &c.

As to the "Regimental or Brigade Collecting Post." This is the station to which casualties, who are unable to walk to the former station, are carried by the regimental stretcher-bearers, and where they are grouped ready to be handed over to the bearer sections of the field ambulances when the necessary touch has been established. It will depend on the disposition of the regiments in action whether a collecting post for each regiment will be necessary—frequently one for two regiments will suffice. It is by no means easy to open up communication from this station with the field ambulances, nor are there any means placed at the disposal of the regimental medical officer for doing so. I therefore consider that the medical officer's regimental N.C.O., whom I have placed in charge of this post, should, among his other qualifications, be a trained signaller. I also suggest that small flags should be provided in the regimental equipment for placing on some neighbouring prominent spot, such as a tree, to aid the bearer sections in locating them—these flags should be so fashioned that the regimental stretcher-bearers can carry them in their pockets. As regards the position of such a post, it should be sheltered from rifle fire, if possible in or around some building; if there is a good road approaching it well under cover so much the better. The most important duty devolving on this station, after the dressings, &c., applied by the stretcher-bearers have been looked to, is the early establishment and maintenance of touch with the bearer sections of the field ambulance working in that area of the battlefield.

In concluding my remarks on the duties of the field medical establishments with units I wish to bring to your notice one point that has forcibly impressed itself on me, and that is, that in addition to the medical officers appointed to each unit of an infantry brigade there should also be added one senior officer to act as senior medical officer of the brigade, and be on the staff of the brigadier-general commanding. This officer would have most important duties to perform, the chief of which would be :—

(i) To supervise sanitation in the brigade.

(ii) Choose the location of brigade and regimental lightly wounded aid and collecting posts, and arrange for the establishment of touch with the field ambulance.

(iii) Organize a systematic searching of the field for wounded.

(iv) Arrange for evacuation and distribution of the daily sick of the brigade.

(v) Issue orders for the replenishment of the surgical and medical materials after an action.

(vi) Keep in constant communication with the administrative medical officer during the progress of a battle.

I shall have more to say about this last duty in my remarks on intercommunication in the field.

Equipment.—(i) *Medical and surgical equipment* consists of one surgical haversack, one field medical companion and one pair of panniers. In addition, one first field dressing is carried by every soldier in his right-hand skirt pocket. Is the surgical material from these sources sufficient to deal with the number of wounded likely to accrue in a unit in a modern battle? I think not. In the surgical haversack (1905) there are twelve loose-woven and four triangular bandages, 15 yards of double-cyanide gauze, and 12 oz. of double-cyanide wool. In the field medical companion (1905) there is exactly the same material, plus 1 yard of thin calico, which might be torn up into bandages. In No. 2 field medical pannier (1905) there are sixty loose-woven bandages, four triangular bandages, 95 yards of double-cyanide gauze, 3 lb. of double-cyanide wool, and 4 yards of thin calico. The cyanide wool and gauze are extremely useful as dressings, and could be readily applied if collodion flexile were provided for the purpose, but it is not. You must remember that a wounded man very frequently has not only the entrance and exit wounds caused by one projectile, but may have half a dozen such. It is therefore suggested that each unit should be provided with far more surgical material, say, four surgical haversacks and a reserve of 100 first field dressings.

(ii) *Medical Comforts.*—The only "medical comfort" supplied is 1 lb. of Bovril in No. 2 pannier. The only means of cooking is one "Warmer, Food (Spirit Lamp, Mark 1)" in No. 2 pannier.

Nothing revives a wounded man so rapidly as hot soup. The amount of medical comforts and means for boiling large quantities of water are inadequate. It is advisable that one medical comfort pannier and two camp kettles be added to the equipment of the medical establishment with units.

(iii) *Equipment for throwing up Shelters for Wounded.*—I consider that some sort of trenching tool is necessary for this purpose and should be carried by the stretcher-bearers; also some cutting instrument, a small axe or knife like the Ghurka's kookrie, would be valuable for lopping off branches of trees, &c.

Mention has already been made of the need for small flags for directing purposes. This completes what I have to say regarding the medical establishment with units.

(ii.) FIELD AMBULANCES.

Duties of Commander.—Field ambulances are tactical units. I will, therefore, commence by a few remarks on their tactical handling. Every officer and man in a force is bound to help the General Officer in Command, to the best of his ability, to win the battle, and should certainly refrain from doing anything to hinder him in his aim. Now, the ambulance wagons of a field ambulance are most conspicuous objects, and can readily be seen from a long distance—if, during a tactical deployment of a force, numbers of these wagons are seen making their way to any part of the field of battle, it is obvious to any enemy that an attack is coming from that quarter.

I told you, in my description of the medical manœuvres, how ambulance wagons, moving out from the field ambulance bivouac, were easily seen by the enemy, and I said that I would refer to the matter hereafter. Well, at the battle of August 23rd, the movement of ambulance wagons from the bivouac to our right flank was observed by the enemy, and our Commander's projected attack on their left flank was thus disclosed. There is no reason whatever for field ambulances making any movement on to the battlefield until the tactical deployment of a force has been fully developed, and when no movement of theirs can in any way affect the military situation. Remember, that an ambulance wagon can, if necessary, be rendered much less conspicuous by dropping the top, as is done when in transit by rail, mechanical means being provided for this purpose on Mark VI type of wagon. In the other types not provided with this contrivance, the top might be removed altogether. Now what are the further duties of a commander of a field ambulance regarding the handling of his unit? This is what I conceive should be his action : When the battle commences he should ride ahead on to the battlefield, accompanied by the serjeant-major; ascertain for himself what is occurring in the area allotted to his unit; endeavour to find out the location of regimental or brigade collecting posts; rapidly appreciate the situation as regards the best way of opening touch with the regimental medical establishments; determine the positions for his field stations and routes for the evacuation of the wounded from the battlefield. Having done this, and ascertained that the tactical development of the troops is fully accomplished, he can send the serjeant-major with the necessary orders to his unit. A commander of a field ambulance must be an officer of resource and initiative. Once the disposition of the field ambulances has been made by the administrative medical officer, it is wrong for him to issue detailed orders for every movement; commanders should have the entire handling of their units in the areas allotted to them. It is most inadvisable for an administrative medical officer to interfere with, and so warp, the initiative of his field ambulance commanders, so long as no glaring tactical or administrative error is committed. In order to enable the administrative medical officer to secure the necessary co-ordination between the several units, it is the duty of the field ambulance commander to keep him constantly informed as to his movements and disposition. Another important point is, that individual methodical action of the sub-divisions of a field ambulance, when working in company with other sub-divisions, as well as when alone, must be maintained by ambulance commanders. This distinct sub-divisional control is essential for rapidity of work. We will now consider that a field ambulance has been brought on to a field of battle with a due observance of every tactical consideration, and its first duty, that of establishing touch with the regimental medical establishments, has been accomplished.

Work of the Unit.—The next duty for the unit is to form its field stations, and I am now going to describe to you my ideas of how these stations should be organized. First, what I have called the "advanced dressing station" in my account of the medical manœuvres, but which I now propose to designate the "dressing station," should be formed. It may be necessary on occasions to establish two such stations. This is done by the bearer division, or sub-divisions. They should be located in a position protected from shell and musketry fire, and with due consideration of the military situation. At this station, or stations, the ambulance wagons are parked. The equipment necessary to form the station is medical and surgical material, a comfort pannier, fuel, and a water-cart. Stretchers would also be carried there. The bearers would then proceed to carry casualties from the collecting posts of the regimental establishments, and group them ready for transport in the ambulance wagons. After any necessary medical attention (such as relief of over-tight bandages, urgent re-dressings, looking to tourniquets, &c.), and nourishment have been given, the wounded will be dispatched, as quickly as circumstances permit, to the station which I have previously described as the "main dressing station," but which I now propose to call the "ambulance station."[1] This ambulance station is formed by the whole tent division, or one or more sub-divisions, and its organization and location is of paramount importance.

It should be established, if possible, on the main lines of advance and retreat, near to roads, with an ample water supply in its proximity—its distance from the firing line is a matter admitting of argument, I should say three miles at least. It should have complete immunity from long range rifle or shell fire. As its location is of such importance, I suggest that the advice of the divisional general staff should, if possible, be sought on the point.

As to the organization of this station: It should be divided into the following sections, with special *personnel* told off for each:—

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[1] In my lecture I termed the "ambulance station" the "field hospital." I think "ambulance station" is perhaps a better term.

(*a*) Receiving and Classifying Section.
(*b*) Dispatching Section.
(*c*) Seriously Wounded Section.
(*d*) Severely Wounded Section.
(*e*) Mortally Wounded Section.
(*f*) Statistical Section.
(*g*) Packstore Section.
(*h*) Supply Section.

One complete tent sub-division should be detailed to form the Divisional Lightly Wounded Collecting Station—this section is so far removed, and has such different functions from the other sections, that I propose to describe it separately. Please do not forget, however, that I consider it should be looked on as part and parcel of the field ambulance organization.

Now you will say, " What a very complicated organization you are making of this ambulance station," but you will find in actual practice that such a division into sections is absolutely necessary. Let me just discuss the necessity for the sectional organization I propose.

(1) The Receiving and Classifying Section should be under the immediate supervision of a medical officer. As casualties arrive from the battlefield, he classifies them for the Seriously, Severely, and Mortally Wounded Sections, or may order a case straight to the operating tent, which is pitched in the middle of the station.

(2) If you do not organize a separate Dispatching Section, you will find that casualties arriving from the battlefield in ambulance wagons will block the way of, and seriously interfere with, the dispatch of convoys to the clearing hospital.

(3) Then as to the work of the Statistical Section—this is a most arduous duty, and it must be carefully and methodically carried out. A record of the description and destination of every casualty is essential. All trace of casualties is sometimes lost, and, if this does happen, endless worries may ensue. I shall submit to you hereafter my recommendations for the simplification of the work of this section. I may here mention that it is advisable to enter on the tally of each casualty the fact of his admission to any particular field ambulance, in order to avoid duplication of admissions. Thus the letter " A," with the number of the ambulance below it, might be written on the tally thus—

$$\frac{\text{A,}}{1} \quad \frac{\text{A,}}{2} \quad \frac{\text{A,}}{3}$$

This would show that a case had been admitted into either Nos. 1, 2, or 3 field ambulance, and any casualty, arriving at any other hospital in the rear, not showing any such notification of admission into a field ambulance, should be duly entered in the Admission and Discharge book of that hospital.

(4) In the severely and seriously wounded sections, cases would be classified for transport to the rear in the following categories:—

(i) Stretcher cases.
(ii) Ordinary lying-down cases.
(iii) Sitting-up cases.

Those cases unfit to be moved must also be sorted out. You must remember that the classification of casualties in the first line of medical assistance is often largely based on the effect of the wound on the man's future efficiency as a soldier, but this classification does not always coincide with his capacity for standing fatigue in further transport to the rear.

(5) The need for a mortally wounded section is obvious.

(6) The supply section deals with the feeding of casualties, and should be, together with the packstore section, under the special charge of the quartermaster of the field ambulance. In my remarks on the equipment of a field ambulance, I shall have more to say on the feeding of casualties.

(7) The packstore section takes over the arms and accoutrements of casualties, and an inventory of them is made. It is tedious work.

I hope I have told you enough now, to convince you of the necessity for a sectional organization of this field station — the difficulty is, to maintain it when once formed, when there are large numbers of wounded to deal with.

I now come to the "Divisional Lightly-wounded Collecting Station." As I have previously told you, this is the station, the location of which section 75, para. 2—ii, chap. x, Field Service Regulations, part II, directs should be notified in operation orders. It should be formed by one or two tent sub-divisions of a field ambulance. Regarding a suitable site for it, the following appear to be the main considerations:—

(1) A group of buildings or a village, a prominent feature in the landscape.

(2) On the main road which will be used in case of retirement. You know it is one of the principal duties of the medical service to ensure that any lightly-wounded men should not fall into the hands of the enemy in case of, what I will term, a rapid strategical movement to the rear of your force—the capture by the enemy of your severely wounded does not matter nearly so much.

(3) An abundant water supply is essential.

(4) Great diversity of opinion exists as to the distance from the battlefield of this station. I have heard twelve miles suggested! This is the ideal distance at which a clearing hospital should be located. I consider six miles (approximately) the proper distance. A wounded man whom it is considered necessary to pass back there from a regimental lightly-wounded aid-post, if due discrimination has been observed, would never be able to march such a distance as twelve miles. The mentality of a wounded man must receive due consideration in fixing the location of this station.

It is at this station that you must be prepared to give lightly-wounded casualties a substantial meal, and where, possibly, you may have to provide sleeping accommodation for the night. It is the second barrier for preventing lightly-wounded men, who will soon be able to return to the fighting line, from straggling to the hospitals in the rear. I again impress on you the importance of this duty. In the "Medical History of the Russo-Japanese War," it is recorded that at the Battle of Mukden, out of about 30,000 casualties, 20,000 found their way to the hospitals on the lines of communication without passing through the field ambulances. I wonder how many of this 20,000 would, after a rest and medical attention at such a station as I am describing, have been able, after a short time, to return to the fighting-line! We must never allow such a thing to happen in our army on service. I need hardly enlarge on the paramount importance of a good system of organization at this station, without which the crowds of casualties pouring in from the battlefield would soon lead to insuperable chaos. It would take me too long to describe what form I think this organization should assume; at any rate, one of the important duties would be, to pass on to the clearing hospital, as quickly as possible, any casualties who, from the nature of their wounds, would not be likely to be fit for the fighting-line within twenty-four hours. You would of course make use of any local resources you could lay your hands on for cases requiring transport. Civilian help in tending and feeding casualties should also be enlisted.

The question naturally arises: "What organization exists to ensure that the wounded despatched from the regimental aid-posts to the divisional collecting station arrive at their proper destination?" No such organization is definitely laid down, but it could be improvised without difficulty.

Personnel.—The commander of a field ambulance should, in my opinion, be extra-sectional—he, as you know, is in command of "A" Section—I think he should be freed from all professional work during an action; if he is not, his initiative as a commander will be warped. Regarding rank and file, I consider the arrangement of the *personnel* requires revision on the following points :—

(i) The *personnel* of the tent division is inadequate.

(ii) The number of men forming a stretcher squad is more than required. I propose that the stretcher squads should be reduced to four men, and that the *personnel* thus saved, should be added to the tent sub-division.

Equipment.—(i) The circular tents provided are of unsuitable shape for the treatment of sick and wounded, especially if they are placed on stretchers. The Indian field hospital type of tent, consisting of two side flies, with curtains of 18 in. on each side, would be an improvement. It has the advantage over a circular tent of accommodating more cases in the same space, and is more convenient for the attendants.

(ii) We had no opportunity of testing the "bull's-eye" lantern for searching for wounded at night during the manœuvres. It is evident, however, they would be well-nigh useless for the purpose. You may justly accuse me of having neglected to say anything regarding work in the collecting zone at night, the time when most probably the whole work of collecting casualties would have to be done—my excuse is that the subject would require a special lecture, and there is no time for it now.[1] In connection with the subject, I will only make this remark, that a high candle-power lamp, of petrol-gas or acetylene, is urgently required for searching for wounded, to which should be added a signalling apparatus, as calls for a medical officer by searchers would be frequent, and signalling would prove a handy means of obtaining this assistance.

(iii) A much larger number of directing flags is required.

(iv) Portable field kitchens are essential. One for each field ambulance has been suggested, but with the sectional organization of the field ambulance, "one" of anything can never be accepted; there must be one for each section.

(v) I will only just mention such items as an improved operation table, a mouth-gag, tincture of iodine, &c., which are urgently required.

Administration. (i) *Statistical Section.*—The statistical returns that have to be compiled contain much unnecessary detail, causing very heavy clerical work. Considering that each casualty is provided with an identity disc, it is suggested that the only details required to be entered in the Admission and Discharge Book for each casualty are: regimental number, regiment, nature of wound or disease, how disposed of.

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[1] One of the tasks at the second tour embraced the collection of casualties at night.

(ii) *Packstore Section.*—The work of this section might be much diminished by taking over the patient's kit in bulk, each kit being distinctly labelled with the man's number and name, and by transferring it unopened with the patient. The checking of the details of the kit could be postponed until it reaches a stationary hospital.

Nomenclature of Component Parts of a Field Ambulance.—I will conclude my remarks concerning field ambulances by a suggestion as to the change of nomenclature of its component parts. It has been found that the present designations of these are most confusing, and require simplification. I suggest the title of "bearer and tent divisions" be changed to "bearer and tent companies." The term "division" to be reserved for the present sectional sub-divisions. Thus a field ambulance would consist of a "bearer and tent company," one section would consist of a "bearer and tent division."

B. COMMUNICATION IN THE FIELD.

I conclude you are all well acquainted with the usual means of communication in the field, described in section 17, chap. ii, Field Service Regulations, part I. I am now going to discuss the special means at the disposal of the medical service, and how I suggest they can be improved. During an action, the administrative medical officer of a division is with the general officer commanding, and there also is the officer in charge of divisional communications. The brigade commanders communicate with the general officer commanding principally, I should say, by means of the field telegraph. You will find it stated in para. 11, section 77, chap. x, Field Service Regulations, part II.: "But a constant transmission of information regarding the situation, as affecting the number of casualties and the area where they are occurring, should be kept up between brigade and divisional headquarters, in order to enable the divisional administrative medical officer to maintain the links and have the reserve field ambulances and transport material brought up to the proper place at the proper time." I propound two questions to you concerning the above quotation:—

(1) Who is going to transmit this information from brigade to the divisional headquarters?

(2) What means has the administrative medical officer at his disposal for communication with field ambulances or other units?

(*a*) As regards question (1): I suppose the brigadier or his brigade major are supposed to do this. I submit that they would be far too busily engaged in other duties to find time to do so—in the Medical Manœuvres not one scrap of information from this source ever reached me. I suggest that one of the principal duties of the Senior Medical Officer, whom I have proposed should be added to the staff of the brigadier, would be to transmit such information to the administrative medical officer by means of the field telegraph.

(*b*) As regards question (2): The answer is "practically none." The administrative medical officer has one staff officer who could possibly be utilized for this purpose; I have previously described to you what duties he was performing during the actions which occurred during the special manœuvres. I recommend that three mounted orderlies be placed at the disposal of the administrative medical officer. I do not think cyclist orderlies would be found suitable in all kinds of battlefield grounds. Now as to the other necessary links of communication:—

(1) *From Regimental Medical Establishments to Field Ambulances.*—No means for communication exist in the present organization of the regimental medical establishment. I have already suggested that the regimental N.C.O. should be a trained signaller.

(2) *From the Field Ambulance Commander to his Section Commanders and to the Administrative Medical Officer.*—The commander of a field ambulance should keep in constant communication with the administrative medical officer concerning the disposition of his unit. I have already brought to your notice how extremely important I consider the sub-divisional control of a field ambulance to be, and also the individual methodical action of its sub-division when working in company with other sub-divisions, as well as when alone. The means for carrying out these important duties of intercommunication consist of one bicycle orderly allotted to "A" Section, and six trained semaphore signallers, two to each section. In addition, there are a certain number of riding horses in a field ambulance; they might be made use of as an auxiliary

for communication purposes. I had previously thought additional cyclist orderlies should be added to the establishment, but, on reflection, I do not consider this necessary.

(3) *Inter-Sectional Communication.*—This, I consider, can be efficiently carried out by the means I have alluded to in the foregoing remarks. I will conclude my remarks on intercommunication in the field by a reference to the semaphore mode of signalling adopted by the medical service. This was not a success at the Medical Manœuvres. It was stated that signals were read with difficulty—I never quite understood why, myself, but the complaint was general. It would appear desirable that the Morse Code system should be adopted. I have previously referred to the instrument I suggest might be used for night work.

C. THE AUXILIARY TRANSPORT PROVIDED BY THE ARMY SERVICE CORPS.

In section 78, para. 7, chap. x, Field Service Regulations, part II, it is stated, "the empty wagons of supply columns and parks returning to replenish at the advanced base may be used for this purpose." The purpose referred to being the conveyance of sick and wounded back from clearing hospitals to the stationary hospitals or to the railway. It would be the duty of the administrative medical officer to arrange with the divisional transport officer as to a suitable rendezvous for this auxiliary transport. A position near the dispatching section of the ambulance station is advisable. I have told you in my narrative of the Medical Manœuvres how the transport and supply column and park were used on that occasion.

The question is, "Could one always rely on this auxiliary on active service?" I think not. In chap. vi, Field Service Regulations, sections 42 and 43, you will learn how these transport columns and parks work. If you study these sections, you will readily recognize that this mode of transport for sick and wounded from the field ambulances to the clearing hospitals, and on to the stationary hospitals and the railhead, cannot be depended on. In section 42, which I have previously quoted, it is laid down that the supply columns may be used, on occasions, only to carry supplies obtained locally; and in section 43, para. 2, it states that the supply parks may possibly only be used to extend the radius of action of the supply columns in obtaining supplies from local resources. How then can this transport be looked on with certainty as a means of transport for sick and wounded?

There is no mention in the Field Service Regulations of the auxiliary transport companies of the Army Service Corps, which form the connecting link between the railway and the ammunition or supply columns or parks of the army being used for the conveyance of sick and wounded. I do not know why. They certainly would be available for that purpose occasionally. You will find them described in section 62, para. 2, chap. viii, Field Service Regulations, part II, and in War Establishments, 1910-1911, p. 148.

I think I ought here shortly to describe to you the reforms in transport and supply which are shortly to be brought about in the administrative transport of the expeditionary force. This will affect enormously the question of evacuation of sick and wounded from the field ambulances. The broad principle is, that motor vehicles generally will replace horse transport. I do not think it will be a waste of time if I give you details of these new proposals.

Details of New Proposals.—(1) All fighting units to carry a reserve ration (iron-ration) on the man or horse (in addition to the present emergency ration).

(2) Regimental transport to consist of the present first line transport, *plus* water-tank carts and travelling kitchens.

(3) All other regimental transport to be grouped by divisions, &c., and to form units of the Army Service Corps. These Army Service Corps units to be capable of division for brigades, &c. The supply wagons will, as now, carry one complete day's supplies and forage, *plus* an extra grocery ration.

(4) The supply wagons of the above Army Service Corps units to be replenished daily from the railway by mechanical transport convoys of fast motor lorries. [The carrying capacity of motor lorries for the cavalry and army troops to be 30 cwt., and for all other formations 3 tons.

(5) The motor lorries and light tractors required to complete the numbers necessary for mobilization to be obtained by means of a subsidizing scheme.

(6) Special motor lorries and horse-drawn vehicles to be built for the conveyance of fresh meat, which will be carried in quarters suspended from the roof of the vehicle.

(7) The driving and slaughtering of cattle and sheep to be removed from the vicinity of the troops.

(8) Field bakeries and field butcheries to be established on the railway line, each capable of turning out daily 22,300 rations of fresh meat or bread.

(9) All other supplies to be sent by rail from a main supply depot to the regulating railway station, whence they will be forwarded daily to the railway refilling point, to which the fresh bread and meat will also be sent.

(10) Separate supply columns and ammunition parks to be made for the cavalry division and for army troops.

(11) Exploiting detachments have been added to the "train" of brigades and other formations. These consist of one officer and six to eight other ranks, mounted on bicycles, whose duty it will be to proceed, whenever practicable, with the advance guard, and obtain such supplies as hay, fuel, wood, fresh vegetables, &c. They are also available for general requisitioning duties.

(12) Six reserve convoys (horsed), capable of carrying two days' preserved rations for the whole force, to move in rear of the fighting troops, at least 30 miles behind, and in such a position as not to interfere with the free passage of the mechanical transport. These reserve convoys are considered necessary in the event of railway or mechanical transport not being available from unforeseen causes, such as abnormal weather, heavy floods or snow. This horse transport will also furnish immediate replacement of heavy horse transport casualties at the front, when time does not admit of replacement from the transport depots.

Advantage has been taken of the change of system to convert the whole of the divisional ammunition columns into mechanical transport ammunition parks.

D. CLEARING HOSPITALS.

You will wonder why, in undertaking to deal in this lecture with our field medical organization in the collecting zone, I have thought fit to include clearing hospitals, as they belong officially to the line of communication and the evacuating zone. My reason for doing so is, that I am strongly of opinion that these units should belong to the divisional organization, and that their proper place is in the collecting zone.

Now in the army for home defence you have no organized clearing hospitals—the administrative medical officer of the Highland Division, Territorial Force, who I am sorry to say is unable to take part in this tour, has written some notes on the subject of the relation of the British Red Cross Society to the Royal Army Medical Corps, Territorial Force, in the field, with regard to these hospitals, which Lieutenant-Colonel Kelly will read to you to-night. I shall, therefore, only deal with the organized clearing hospitals of the regular army. Now the Field Service Regulations tell us, among other points, the following concerning clearing hospitals; they are contained in Section 78, paras. 2, 3, and 5, chap x., part II, Field Service Regulations:—

(1) That they resemble a tent division of a field ambulance on a large scale.

(2) That they form the central point upon which the collecting zone converges and from which the evacuating and distributing zones diverge.

(3) That they are the pivot upon which the whole system of evacuating sick and wounded turns.

(4) That it is their business to push up within reach of the field ambulances, and, on certain occasions, to go right up to the latter units and take over the sick and wounded on the spot.

Surely no stronger arguments than these can be adduced to prove that clearing hospitals should be included among the units under divisional control.

Now let us examine the functions of these units more closely. Their first duty is to take over casualties from the field ambulances. In order to do this they must be brought within a few miles of these units. The ambulance wagons of a field ambulance, you must remember, are constantly moving to and fro between the dressing and ambulance stations, and, by the end of the day, the animals pulling them have done an enormous lot of work, and would not, therefore, be in a fit condition to undertake a journey to the clearing hospital of a longer distance than about ten miles there and back. I have already pointed out to you how much reliance can be placed on the auxiliary transport supplied by the Army Service Corps for the above purpose.

The second function of a clearing hospital is to evacuate as quickly as possible casualties received from the field ambulances to the nearest stationary hospital and railhead. This duty is again allotted to the empty wagons of the supply column and park returning to replenish at the advanced base. It is laid down in Field Service Regulations, that this transport will be reinforced by vehicles provided by hire or requisition, or by specially organized sick and wounded sections attached to the clearing hospitals. This local improvisation of transport presupposes that the enemy would have allowed it to fall into our hands.

Do you think that in the case of our expeditionary force operating in an enemy's country an alert foe would have been so thoughtful as to do this? I am doubtful on the point.

Do you not think that what I have said proves the point that I was leading up to, and that is, that a clearing hospital should be provided with its own properly organized transport for sick and wounded? I think this "*convoy division*," as it has lately been termed by a writer on the subject, should be composed of motor-driven ambulance wagons and 'buses. I find that I must draw my remarks to a close. I had intended to go more fully into the functions of a clearing hospital, but I have no time to do so.

In conclusion I have only one further remark to make. Have you noticed what a close resemblance there is between the *personnel* and equipment of a clearing hospital and a stationary hospital? As regards *personnel*, the latter *may* have nursing sisters, and the former never has; as regards equipment, the stationary hospitals *have* bedsteads and the clearing hospitals *have not*.

QUININE AS A MALARIAL PROPHYLACTIC: A CRITICISM.

By Captain P. S. LELEAN.
Royal Army Medical Corps.

There are few questions of tropical preventive medicine of more practical importance than that of the value of quinine in malarial prophylaxis—an importance enhanced by recent advocacy of a policy of reliance upon this method of prevention, to the exclusion or diminution of efforts directed towards reducing mosquito prevalence. That policy appears in India to be due largely to a somewhat enthusiastic representation of the success of quinine prophylaxis in reducing malarial incidence upon certain jail populations. One such representation has been circulated by the civil authorities in pamphlet form, and contains this summary of the views of its responsible medical author: "Take quinine regularly and one is absolutely malaria-proof; neither mosquito campaigns nor mosquito-nets, nor any other wonderful contrivance or device to deal with these insects is required."

Such a dictum on an important and complex problem would be comparatively harmless if presented only to professional men in a position to gauge its value accurately; it must, however, be considered seriously when cited by a non-expert administration as justifying the adoption of a policy so ineffective as to be ultimately as costly as it is initially cheap. The unfortunate consequences of this professional hemianopia were prominently brought to our notice in connection with an appeal for civil co-operation in dealing with the notorious unhealthiness of a military station, garrisoned solely on civil considerations. The reply to that appeal consisted of an expression of the pleasure felt in bringing to the notice of the military medical authorities a means of malarial prevention so simple as to render all other measures unnecessary—as shown by an enclosed copy of the pamphlet referred to above.

A study was at once made to see whether the available data afforded any support to these extreme views. The observations then made were so strikingly and unexpectedly adverse to the claims put forward that they have been revised and extended. The conclusions drawn from them have confirmed the initial observations to an extent which leads to the hope that their publication may prove interesting to those striving to combat what—in the light of these data—cannot but be regarded as a policy likely to prove disastrous to the health of the Army in India. The conclusions drawn may be thus impartially summarized in the words of the Senior Medical Officer of the station referred to above: "I am greatly disappointed to find that my experience here does not support my previous ideas about quinine prophylaxis. Everything was done here last season to give it a chance, and yet I must admit that it has done little good."

These data may be dealt with under the headings of jail and military statistics in India, per mille rates being adopted throughout, and the latest figures obtainable from official returns being embodied. The jail rates are those for India and Burmah.

JAIL STATISTICS FOR INDIA AND BURMAH.

A.—*Analysis of the General Admission, Death, and Case Mortality Rates.*

Confidently postulating able medical administration, it was expected that the prophylactic use of a drug capable of rendering prisoners "absolutely malaria-proof" should afford striking evidence of its value when the above rates were charted. As the value of the method was demonstrated and more widely recognized, its more general adoption should have been reflected by a progressively rapid decline in the malarial admission-rate. The charts are reproduced, and it remains to consider to what extent they represent the actual prevalence of malaria and the influence of prophylactic quinine upon that prevalence. (Chart 1.)

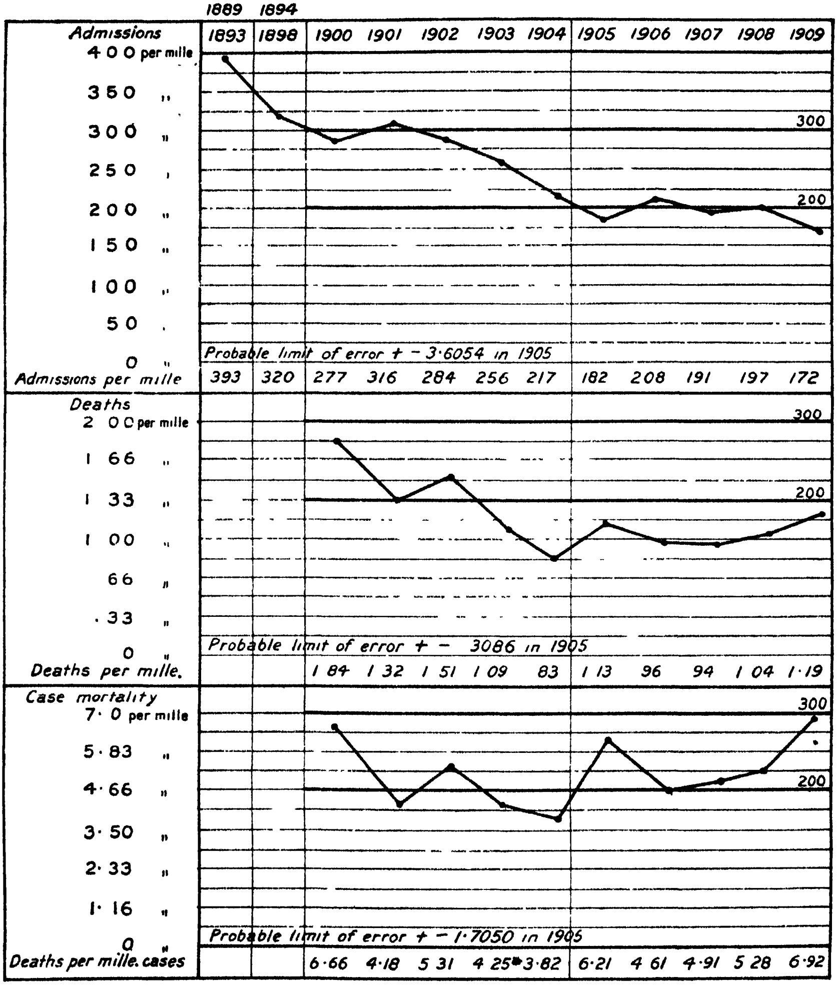
If statistics affecting large numbers and extending over a series of years show, when charted, an unmistakable and well-marked general tendency, it is permissible for purposes of demonstration to bridge by a dotted line isolated years which break the uniformity of that general tendency. The malarial admission-rate of a jail population averaging over 97,000 shows during the past twenty years a general decline. That general decline is broken by two rises which, while larger than the actuarial limit of statistical error, are yet within the limits of seasonal variation. Comparison with the total-mortality and case-mortality rates makes it evident that 1901 and 1905 are the abnormal years; they are therefore bridged and the three curves, thus modified for facility of comparison, are projected to scale upon the same chart thus (Chart 2):—

To what extent do these figures indicate the actual prevalence and severity of malaria?—Three essential factors are indicated by the Sanitary Commissioner as influencing the value of malarial statistics of the jails. The following attempt is made to gauge their value.

(*a*) "*Great Divergence in Diagnostic Practice.*"

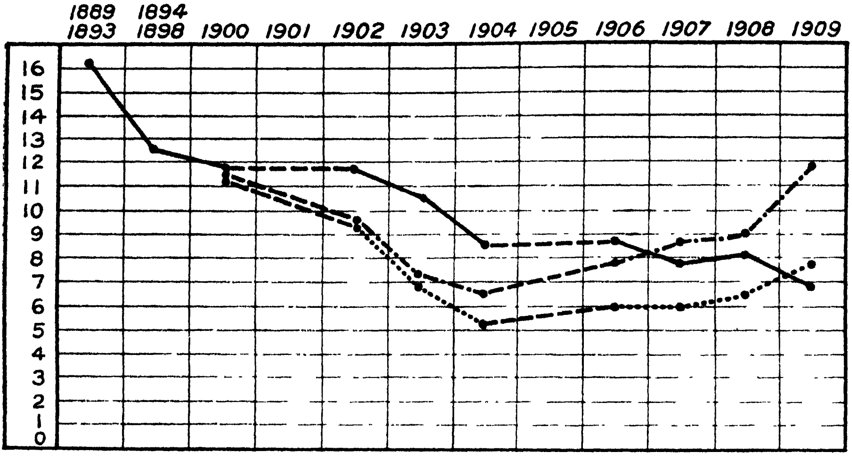
CHART 1.—*Indian Jail Statistics.*

General malarial admission, death and case-mortality rate, per mille.



There is little room for doubt that this factor tends constantly to augment the malarial returns. In considering the malarial admissions of a series of years, it is evident that their relation to each other is therefore only affected by variations in the degree of that augmentation. With so large and scattered a population and so many workers, variations in diagnostic practice should tend to equalize each other and balance out in the annual returns.

CHART 2.



Total malarial admissions per mille ————
Total malarial case mortality ,, —·—·—·—·
Malarial deaths ... ,, cases ....

Line 12 = Admissions .. 300·00 per mille, Deaths .. 2·00 ,, Case-mortality 7·00 ,,
Line 8 = Admissions .. 200·00 per mille, Deaths .. 1·33 ,, Case-mortality 4·66 ,,

N.B.—The bridged years 1901 and 1905 are shown by dotted lines.

That this argument is sound is shown by the table of comparative admissions, for (*a*) all causes, (*b*) malaria, (*c*) the alternative headings under which malarial cases might be returned. It is clear that any tendency to return malarial cases under alternative headings would be shown by a marked difference in the normal ratios of those headings.

	(*a*)	(*b*)	(c) ALTERNATIVE HEADINGS		
	All causes	Malaria	Pyrexia of uncertain origin	Influenza	Debility and anæmia
1900-1904	**781**	**270**	**11·7**	**12·4**	**14·6**
1905	661	182	9·7	11·5	11·0
1906	620	208	9·7	5·9	12·5
1907	521	191	5·1	4·9	11·2
1908	656	197	9·4	4·2	11·8
1909	635	172	10·8	1·5	11·8
Average **1905-1909**	**618**	**190**	**8·9**	**5·6**	**11·6**

The percentage reductions which have occurred in the figures of the two quinquennia work out thus:—

Admissions from all causes	reduced to	79·1	per cent.
,, for malaria	,,	70·4	,,
,, of three alternative headings	,,	67·4	,,

It is evident that the entries of the combined alternative headings have fallen more rapidly than the malarial rate itself, so that there is no question of their having been inflated. Moreover their total combined figure is but 13·2 per cent of the malarial admissions, and variations must be enormous if sufficient to alter appreciably the malarial rate.

(*b*) "*Ascribing to Malaria Deaths due to some other Cause.*"—Malaria affords the simplest diagnosis, and easiest treatment, for a number of grave conditions associated with fever—whether intermittent, remittent or hyper-pyrexial. Conversely, relatively few malarial deaths appear likely to be ascribed to other causes—such being certain rare forms of "cerebral" and "algide" varieties, which are themselves uncommon. Here again we have a factor with a constantly augmenting influence upon the malaria statistics and hence one of which the fluctuations, rather than the total amount, need be considered with regard to the relationship of individual years of a series. This is supported by the fact that in some districts as many as 25 per cent of cases of post mortem examinations on deaths attributed to malaria showed the true cause of death to have been other than malaria.

Even after making allowances for errors of diagnosis and the probable limits of statistical error, and after considering Chart 1 as unmodified, there appears no reasonable doubt that the decline in the malaria death-rates which characterized the quinquennium 1900 to 1904 has not been maintained since 1904. This applies in greater force to the case-mortality rate which declined from 1900 to 1904; rose from 1904 to 1909; and stood in 1909 a few points higher than in 1900.

Statistical logic teems with intricacies and the path of the statistician with pitfalls, but the conclusions to be drawn from Chart 2—if its general accuracy be admitted—are so interesting and apparently conclusive that the path must be followed.

(1) If the total and case-mortality rates both rise and the latter the more steeply—as shown in Chart 2—it can be mathematically shown that this feature can only be produced by the association of two factors acting together. Those factors are (i) progressive diminution in the malarial admission-rate and (ii) progressive

increase in the relative tendency to a fatal ending of the malarial cases admitted.

These factors need consideration in the inverse order.

Factor (ii.)—*Progressive Increase in Mortality among Cases admitted for Malaria.*—Assuming that treatment has not become less skilful during the last decade, there remain two possible explanations of such an increase:—

(1) That quinine has lost its curative efficacy. This, in turn, must be due to:—

(*a*) A larger proportion of quinine-resisting, malignant infections among the admissions, which, apart from alteration of the normal ratio by elimination of mild cases from the returns, there is no reason whatever to believe has been the case, or—

(*b*) Increased resistance of malarial plasmodia to the curative action of quinine, of which the reasonable explanation is that constant use of ineffective "prophylactic" quinine has produced strains of plasmodia habituated to, and thus resisting, that drug.

(2) That mild cases have been eliminated from the returns, thus artificially increasing the proportion of malignant, resistant infections among the admissions.

To recapitulate—either prophylactic quinine has actually increased the number of deaths from malaria (by producing quinine-resisting strains), or else mild cases have been excluded from returns. The former alternative can hardly be acceptable to the advocates of this method; it remains to see whether the latter proves so. This brings us to:—

Factor (i.)—*Progressive Diminution in the Malaria Admission-rate.*—This may be real or artificial. It has just been shown that, if the mortality rates be approximately correct, a real diminution in the admission-rate must have been associated with an increase in severity, which, in turn, proves unacceptable. The only alternative is that the diminution must be artificial, and the result of omission of cases from statistics. It has also been shown that malarial cases have not been returned under alternative headings; they must, therefore, have been treated as out-patients and omitted from returns altogether. This constitutes the third consideration raised by the Sanitary Commissioner:—

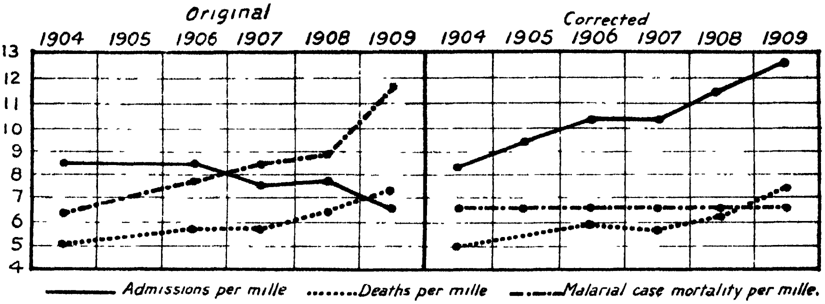
"(*c*) *Treating Cases of Malaria without admitting them to Hospital.*"

It is evident that admission (and return) of only relatively severe cases must proportionately raise the case-mortality, while having but little effect, *per se*, on the total malarial death-rate, which is so largely maintained by those malignant forms on which quinine admittedly has slight action. It follows that the disparity between the total and case-mortality rates thus affords a gauge of the extent to which it has been the practice to exclude slight cases of malaria from the returns. The formula by which our chart may be thus corrected is simple :—

$$\text{Malarial admissions per mille} = \left\{\frac{\text{Total malarial deaths per mille} \times 1{,}000.}{\text{Per mille mortality of malarial admissions.}}\right.$$

It having been shown that the rise in case-mortality seen in Chart 2 cannot be accepted, it is instructive to re-chart the last quinquennium as it would appear without that rise.

CHART 3.



It is seen that, in place of a reduction, there has actually been a considerable increase in the prevalence of malaria during the past quinquennium. This alternative, therefore, would not appear to be any more satisfactory than the former, and the findings on either count are adverse to the contention that administration of quinine has rendered the jail population of India " malaria-proof."

Even if the malaria case-mortality rate be regarded as having remained constant during this quinquennium, the fall in malarial admissions shown by Chart 2 could only be associated with a 45 per cent error in the returns of malarial deaths, which cannot be regarded as possible. So much for the last quinquennium—what of that of 1900-1904 ? It is apparent that the decline in this period is an actual decline. It does not, however, necessarily follow that it is the result of prophylactic quinine, in fact consideration shows that the evidence points to the contrary. The argument is a brief one :—

(i) Quinine has least action on malignant infections, to which are due the greater proportions of deaths.

(ii) Therefore the results, if due to quinine, must show a greater fall in admissions than in deaths, associated with a rise in case-mortality. The chart shows precisely the contrary in each respect; the fall in deaths exceeds that in admissions, while the case-mortality rate has fallen also.

In concluding this section, it is as well to refer to the general experience of clinicians with regard to the rélative inefficacy of quinine in malignant infection, as diagnosed microscopically. This relative inefficacy is referred to by Castellani and Chalmers.[1] It is therefore obvious that the naked merozoites of malignant plasmodiæ must be more resistant to curative quinine than the plasmodia of the benign infections. It would be most difficult to prove that the same holds good with regard to the resistance to prophylactic quinine, but, in the absence of proof absolute, we are justified in assuming that the naked sporozoites do not differ in this respect from the merozoites. If curative quinine will not destroy the latter, why should it be supposed to destroy the former?

A study of this chart suggests that its explanation must lie in improvements in the general hygienic conditions of the jails, reduction of the mosquito-breeding places affecting the admission- and death-rates equally, while better housing and food further reduce both the total and the case-mortalities. Possibly the introduction of pure quinine, instead of the crude material, may also have assisted treatment and favourably influenced both mortality rates.

B. *Sidelights from the Statistics of Individual Jails.*

(*a*) *Instances in which Prophylactic Quinine has been experimentally tried.*

(i) *Peshawar and Dera Ismail Khan.*—These malarial stations were selected for comparison of the malarial incidence upon groups of prisoners. The groups were of equal numerical strength and average physique. Prophylactic quinine was administered to them in definite amounts, one group having all quinine withheld as a control.

	Year	Men	Quinine given	Malarial admissions. Total
Peshawar	1908	53	*Nil*..	25
		53	5 gr. daily	49
		53	15 gr. on two days per week ..	53
	1909	30	*Nil*	11
		30	5 gr. daily	6
		30	15 gr. on two days per week ..	1
Dera Ismail	1909	47	*Nil*	26
		47	5 gr. daily	7
		47	15 gr. on two days per week ..	2

[1] “ Manual of Tropical Medicine.”

If the three experiments be summarized, the groups of 130 men each give malarial admissions per mille for the period of the experiment as follows:—

	Total	Per mille
(*a*) Getting no quinine	62	476
(*b*) Getting 5 gr. daily	62	476
(*c*) Getting 15 gr. twice a week	56	430

It may be assumed that, in view of this being an experiment, there was no doubt but that the prisoners actually took their quinine and that it was given in an assimilable form. In spite of this the reduction in the amount of malaria achieved by this means was less than 5 per cent, while in the first experiment—made in a bad malarial year—the adoption of quinine prophylaxis doubled the malarial admissions.

Possibly the term "absolute immunity" is sufficiently elastic to cover admissions up to 50 per cent of the strength per annum. In any case, however, the Inspector-General of Jails attributes the "relative immunity" to malaria of Peshawar prisoners to other factors than quinine prophylaxis, to wit—"sleeping in airy barracks which afford no cover for mosquitoes," whereas the police, in adjacent quarters swarming with mosquitoes, give four times the malarial admission-rate of the prisoners. It is clear that the Inspector-General of Jails holds no brief for quinine prophylaxis.

(ii) *Gorakhpur and Saharanpur.*—"Two usually very unhealthy jails" were selected for a special experiment in prophylactic quinine in 1908. It is interesting to compare the total and malaria admission rates since 1907.

		Malarial admissions	Admissions for all other causes
Saharanpur	1907	516	1,015
	1908	336	856
	1909	238	638
	Reduction since 1907 by	47 per cent	63 per cent
Gorakhpur	1907	227	945
	1908	233	770
	1909	167	498
	Reduction since 1907 by	26 per cent	47 per cent

It is evident that the general hygiene has improved in these jails to such an extent that the total admissions from all other causes than malaria have diminished more rapidly than those for malaria—in Saharanpur to the extent of 16 per cent and in Gorakhpur to the extent of 21 per cent.

There appears, therefore, to be no more logical reason for denying the influence of improved hygiene upon the malarial rates than there is for attributing to quinine prophylaxis the greater diminution in the admissions from all other causes combined.

(*b*) *Instances in which Prophylactic Quinine has not been used.*—The most striking example of diminution in malaria, which, to whatever other cause it may be actually due, is certainly not due to the effects of prophylactic quinine, is that afforded by the Lucknow jails and the Central Lucknow Jail in particular.

Per mille Admission Rates.

	All Indian Jails		Lucknow				Jails of Group IV	
			Central		District			
	Malaria	All causes	Malaria	All causes	Malaria	All causes	Malaria	All causes
1907	191·3	521	27·0	165	72·3	355		
1908	197·7	656	8·3	140	46·5	328	251·5	957

It is seen that, in 1908—the most malarial season for many years past—the Lucknow Central Jail gave an amount of malaria which was but 4·2 per cent of that of the rest of India and only 3·3 per cent that of the jails of the group to which Lucknow belongs, while the Sanitary Commissioner remarks "in this year (1908) Lucknow district and town suffered severely from malaria," so that the local conditions were unfavourable. Certain possible explanations were considered:—

(i) This is not a snap figure from a small jail—the 1907 rate was also a very low one, while the annual average strength in 1908 was 1,735.

(ii) Nor is it due to statistical dexterity—the total admissions fell by 15 per cent from 1907, they were but 21 per cent of the figure afforded by the convicts of India in 1908 and there was no case returned as pyrexia of uncertain origin in either year.

There was, therefore, a genuine and quite remarkable freedom from malaria in a most malarial year and in a malaria-infested district. To what was that freedom due? "The jail was three miles from the city and the superintendent attributes the exemption from malaria to the general excellence of the hygienic conditions. . . . . No special anti-malaria measures appear to have been adopted and there was no prophylactic issue of quinine."

It is interesting to make a comparison between this dictum on an 8·3 admission-rate and that on a 204·8 admission-rate, i.e., over twenty-four times as high: "I can state without hesitation that the source of immunity, and practically the only source, was the dosage of every prisoner with quinine 15 gr. per week." One is tempted to ask—what immunity? If a rate of 234 per mille is the expression of being absolutely malaria-proof, one also wonders what figure would represent malaria liability.

If the Lucknow relative immunity were not the result of general sound hygiene, then it was the result of coincident factors of which we know nothing, but which are possibly dominant factors. It is clear that mere opinions are worthless and scientific investigation of facts is essential. As the Sanitary Officer of the Pindi Division condenses the matter: "For some years, indeed, investigatory work is more needed than any other form of energy."

(Since writing the above a communication has brought welcome indication that this view is also held at headquarters.)

(*c*) *Some Apposite Figures from the City Jail of the Particular Military Station referred to above.*

While quinine prophylaxis was being brought to our notice, and every sanitary canon was being meanwhile outraged by the civil population in the immediate vicinity of the garrison, the malaria admission-rate in the city jail was steadily rising, 18 per cent in two years.

1907 Malaria admissions per mille = 245
1908 ,, ,, ,, = 285·1
1909 ,, ,, ,, = 295·5

An interesting light is thrown on these figures by the most instructive observation—made by no less an authority than the Director of the Malarial Research Laboratory—that, despite prophylactic quinine, of the prisoners in this jail in the autumn of 1909, the blood of 37 per cent of those examined contained malarial parasites.

INDIAN MILITARY STATISTICS.

It is a relief to step from the shifting morass of statistical argument on to the terra firma of established facts, which leads to the explanation that, but for this solid take-off, the plunge into the morass would never have been essayed.

The following tabulated information was obtained from stations in the division in which at least 20 per cent of malarial diagnoses had been confirmed by the microscope. Of the whole series, 64 per cent of bloods were examined, and of these 62 per cent confirmed the diagnosis, i.e., 39·7 per cent of the malaria admissions were proved to be malarial. That figure, however, must not be taken as the final word; prolonged search, examination of the visceral blood, and especially a cyto-index, would have converted many of these negatives into positives.

Results	Benign parasites.. ..	66·7 per cent.
	Malignant parasites ..	28·6 ,,
	Unclassified parasites ..	4·7 ,,

It is important to note that the per mille rates given are those which would have obtained had the admission-rate for the period of quinine prophylaxis been continued for the year. They have been adopted as the only means of rendering comparable the varying periods of prophylaxis which have been adopted in different stations.

Quinine was in all instances given in solution, thus obviating any idea that unassimilable tabloids were used. It was given at compulsory parades, carried out under regimental orders, and absentees were reported by the assistant surgeon or medical officer who administered the dose. In some instances, the medical officer (as at Delhi) secured that it was not only taken, but swallowed, by making the recipient answer to his name after taking the dose. There is thus no reason for doubting that the prophylaxis was maintained.

The dosage and intervals adopted were:—

10 gr. on two consecutive days per week = Delhi, Muttra, Agra and Roorkee.
10 ,, at three-day intervals .. .. = Bareilly, Delhi and Meerut.
10 ,, at two-day intervals .. .. = Dehra Dun.
15 ,, on two consecutive days per week = Dehra Dun.

from which it is seen that a thorough and varied trial was made.

RESULTS OF PROPHYLACTIC QUININE ON MALARIA ADMISSION RATES OF SOME STATIONS IN THE 7TH DIVISION, IN 1909.

Station	Strength	Number of days' quinine prophylaxis	Admissions (actuals)	Admissions per mille for a year at the same rate
Bareilly	1,024	60	148	878
Dehra Dun	625	120	140	672
Delhi	497	270	370	1,016
Muttra	488	150	14	73
Roorkee	308	90	69	908
Meerut	1,192	60	186	960
Agra Fort	350	270	281	1,088

These figures were so opposed to one's preconceived ideas of the value of quinine prophylaxis, and present so overwhelming a case against its use, that hesitation was felt in accepting them. It was feared that our precautions must have left some loophole for error, and hence it was decided to collect similar data for another year as a control.

It was also noted that Muttra was the only station in which the results were acceptable as conforming in any degree to our expectations. Muttra reported, moreover, that the regiment there had spent considerable sums on the surface drainage of the station, while prophylactic quinine had not only been administered to the men, but to all families and followers, even including private servants in officers' bungalows. That note was communicated to the other stations, and Roorkee replied that they had experienced far better results since they had adopted similar thorough measures. It was thus felt desirable that the controls for 1910 should be carried out on similar lines, including the administration of quinine to all followers and their children, both in the lines and as far as possible in the bazaars also.

It is important to add this most relevant remark, by the Senior Medical Officer at Muttra, *re* the energy spent on surface drainage and anti-mosquito measures, " . . . the paucity of mosquitoes was noticeable."

Another important point which is brought out is that the benign malarial parasites formed 66·7 per cent of the total malarial parasites found in the blood of men taking prophylactic quinine regularly. This is, perhaps, the most significant fact that we have to face.

RESULTS OF PROPHYLACTIC QUININE ON MALARIA ADMISSION RATES OF SOME STATIONS IN THE 7TH DIVISION IN 1910.

Station	Days of quinine prophylaxis	Admissions per mille per annum—if rate of period continued	Diagnoses proved	Benign parasites
Delhi	230	796	56 per cent	78 per cent
Roorkee	141	315	92 ,,	81 ,,
Muttra	140	635	56 ,,	98 ,,
Agra	148	639	39 ,,	91 ,,

Note 1.—One Native Infantry Regiment at Delhi gave admissions for malaria at the rate of 1,071 per mille for the prophylactic period of 214 days.

Note 2.—Quinine was administered in solution in all cases as follows: Delhi and Roorkee, 10 gr. on two successive days per week under the supervision of the medical officer at Delhi, also an extra 5 gr. was given on the intervening days of the worst period (*vide infra*). Under the supervision of an assistant surgeon all followers and children were given equivalent doses, and at Roorkee those in the bazaars as well as those in the lines.

Muttra.—Fifteen grains once a week to all strength and followers. The Senior Medical Officer remarks, "I sometimes saw it made up, and always saw it administered, while I invariably looked for iridescence in the mixture before it was administered."

Agra.—Ten grains on Thursdays and Sundays, which was changed during the worst period for a daily dose of 5 gr. Followers were similarly treated from July 14 to October 9, while children got from 3 to 5 gr., both in the lines and bazaars.

There appears no doubt that every means was taken in these stations to secure the success of this method of prevention.

Note 3.—The increase in the percentage of benign parasites in the blood of the persons so dosed with quinine is noted specially.

Note 4.—The percentage of cases returned as "initial attacks" is very high, but, pending adoption of the malaria case-sheets recently ordered, this value is only of relative importance. The percentages worked out thus: Delhi, 91 per cent; Roorkee, 82 per cent; Muttra, 22 per cent; Agra, 56 per cent.

Generally it may be remarked that these extended observations fully confirm the approximate accuracy of those of the previous year. The hope that more universal dosage of followers with quinine would produce results elsewhere comparable with those obtained at Muttra, has proved vain—in fact, Muttra, in spite of all its zeal, shows an admission-rate which has risen from 73 to 635 per mille since the previous year.

Measures have been organized by the Principal Medical Officer of this division to ensure complete returns of similar data, which will be available at the end of the present year. Meanwhile he is of opinion that the first figures and their controls are so obviously confirmed and so universally important that they should not be withheld longer.

In considering their bearing and significance, it will be better to concentrate on one station—Delhi—which will give ample material for careful consideration and anxious thought.

Delhi.—(1) Has quinine been taken?

(*a*) With regard to the troops—yes. It has always been administered in the presence of the medical officer, who has made each man answer his name after taking the dose into his mouth. Absentees from the quinine parades have invariably been reported, and with rare exceptions brought up for their dose next day. Quinine has been given in various ways: on two consecutive days per week, every third day, every day and, finally, small daily doses combined with larger doses twice a week.

(*b*) With regard to followers, there has been difficulty. It is not an easy matter to get at the purdah families, but a determined attempt has been made, and it has proved generally successful by mingled persuasion, tact, and threats of eviction. The punkah coolies have proved intractable however—they refused to take quinine; the contractor could not replace them with men who would take it; 50 per cent of them had enlarged spleens. Capital probably will not be made out of this fact when we come to consider the presence of malarial parasites in the blood of those who undoubtedly were getting quinine.

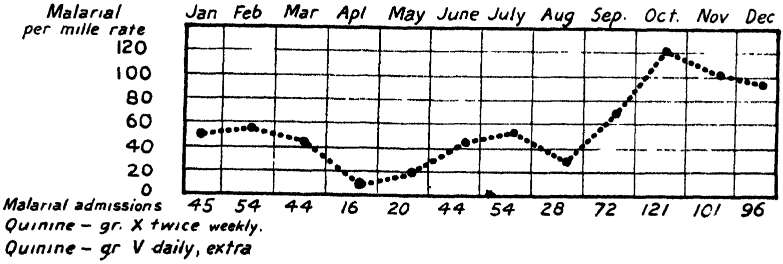
(2) Value of the statistics.

The opinion of the Senior Medical Officer—quoted on p. 464—shows that he brought to the study of this matter a belief in prophylactic quinine, and his confession of disappointment adds point to the statement that everything was done to make it a success, as well as to the guarded admission that it has done little good.

Overwhelming as the admission-rates in the above tables appear, they do not represent anything like the full extent of malarial prevalence. In 1909, the malaria admission-rate for the British garrison of Delhi amounted to 1,144 per mille, but there were also 181 admissions for "pyrexia of uncertain origin," which shows that no clinically uncertain cases were returned as malaria, while over half the cases were proved by microscopic examination to have parasites in their blood. To the above enormous rate we have to add the malarial attacks treated without admission to hospital. For the whole of India the Sanitary Commissioner in 1909 gave the ratios as respectively 202 : 96, while in Delhi itself in September of that year an independent observer (Lieutenant-Colonel P. Hehir, I.M.S.) reported that "It is considered that detentions to actual admissions are as 3½ : 1." The former estimate makes the malarial attacks 1,700, and the latter makes them 4,000 per mille per annum.

(3) The relation between the relative amounts of malaria and prophylactic quinine is best shown by the following chart for 1910:—

CHART IV.



(4) The malarial conditions characterizing Delhi Fort.

It is fortunate that these have been investigated by two quite unbiased observers, whose standing is sufficient authority for their findings. One was Lieutenant-Colonel P. Hehir, I.M.S., and the other Lieutenant-Colonel J. R. Adie, I.M.S., both specially selected for malarial investigation work. The data and quotations in this section are from the reports of these officers.

September, 1909.—Anopheles larvæ were found in each of twenty-nine bela pools examined; the imagines were carried thence into the fort by the prevailing wind.

Of the *Myzomyia culicifacies* captured in the fort, 35 per cent harboured malarial parasites.

Of the followers' children in the casement quarters, 58 per cent of those examined had malarial parasites in their blood.

November, 1910.—Of the followers' children in the fort, 43 per cent of those examined had malarial parasites in their blood.

Of 150 men of the garrison doing duty and not on the sick list, "More than a fourth are carrying about malarial parasites in spite of the large amount of prophylactic quinine that they are taking. It is a most interesting and surprising investigation." "It seems to me that, pending improvements of drainage, you must go in for more and more *efficient* mechanical protection. I doubt if you can give much more prophylactic quinine and expect the men to do their ordinary round of duty." In other words this means that quinine prophylaxis has hopelessly broken down and that, if pressed further, it will break down the garrison also—truly an inspiriting expert opinion for the advocates of this method to ponder upon! So far as this series of observations is concerned, quinine prophylaxis not only fails to justify its ambitious claims of rendering persons "absolutely malaria-proof," but is very hard put to it for ground which will even justify its existence.

Quality of the quinine used during the periods under review.—This appears to be the only avenue of retreat left open; it must ruthlessly be closed. Not only did these men get quinine, but they got quinine of excellent quality.

The first thought on scrutinizing the statistics for 1908 was, that some impure article had been substituted for quinine. Silence was maintained as to these suspicions until later, when the extended observations were well under way. The Senior Medical Officers of the four stations chosen were then asked to personally take samples from the stock bottles actually in use and forward them, securely sealed, for analysis. They kindly took these samples and adopted full precautions as requested.

The full results had better be appended as showing the general accuracy and completeness of the analysis. Owing to limitations of the laboratory, only three samples and the standard could be tested at the same time. The samples thus analysed were from Delhi, Muttra and Agra.

The quinine sulphate was separately estimated by acidimetric and gravimetric methods. The greatest difference in the results by the two methods was 0·6 per cent, and the gravimetric result was higher in each case. The mean of these two estimations is given in the appended table of results.

RESULTS OF ANALYSES OF THREE QUININE SAMPLES.

	Standard	Sample I.	Sample II.	Sample III.
Quinine sulphate	97·60	98·40	97·40	97·65
Cinchonidine	·12	·14	·12	·18
Quinoidine and Cinchonine	trace	·05	trace	trace
Ash	·15	·21	·26	·22
Water	2·60	2·10	2·50	2·45
	100·47	100·90	100·28	100·50

It is seen that the analytical error in no instance amounted to as much as 1 per cent; the variation in the result is probably largely due to difficulty in obtaining absolute accuracy by the gravimetric method.

Lastly, what evidence is there of the effect of the administration of prophylactic quinine upon the amenability of subsequent malaria to the curative action of that drug?

Statistics have been kept which show the relapses occurring among a total of 1,053 malarial patients who attended hospital at Meerut for three months subsequent to their discharge. During that period they received 15 gr. of quinine on two days per week. The drug was administered in solution and in the presence of an assistant surgeon, who kept a roster of these men and strictly enforced their regular attendance. It is unfortunate that the information cannot be expressed in precise terms of the per mille rate of relapses per annum among these men. We do not know what the mean daily strength was exactly, but it must have been approximately 170, for the eighteen months during which the results were kept. In that period there were 734 recurrences among these men—i.e., at the rate of 489 per year. It is, of course, obvious that this is but an approximate calculation—but it shows a per mille per annum attack rate among these men of no less than 2,876, which affords a considerable margin for error without losing its startling character.

Within comparatively recent years it has been taught that the action of quinine upon malarial parasites was so certain that quinine could be relied upon for clinical diagnosis. Was that teaching correct? Has quinine lost that specific curative action? If so, is that loss due to changes in the resisting powers of the parasite? If so, has the parasite become quinine-fast? If so, is that in any degree the result of constant habituation to small doses of quinine given prophylactically? These are questions of the utmost practical importance, and, moreover, of an urgent importance. They are questions to which everyone who has the health of the Army in India at heart wants an authoritative answer. They are questions compared with which those of the time, energy, and money spent on quinine prophylaxis sink into relative insignificance.

In submitting this criticism it is not suggested that quinine prophylaxis, if properly safeguarded, has no value under any circumstances; but it is essential that a protest be made against the one-sided view, that in the wholesale administration of prophylactic quinine we have a simple and royal road to malaria prevention, warranting the withdrawal or omission of all other measures. In the light of the foregoing data, no more dangerous doctrine than this could be advocated, yet its advocacy by their medical advisers has been seized upon by the civil administration as an argument for abandoning more radical measures. It is hoped that this critical analysis of official statistics may draw attention to a most important matter, and enable some of the facts concerning it to be seen in their proper perspective.

PATHOLOGY AND CLINICAL MEDICINE.

By Major W. S. HARRISON.
Royal Army Medical Corps.

The relations of the pathologist and the clinician in these latter days remind one very much of the old-time feud between the physician and the surgeon. On the one hand there is the extremist pathologist, with a limited knowledge of clinical work, pouring scorn on bedside methods and failing to realize the difficulties which confront the man in charge of sick people, difficulties arising from the uncertain guide given by the symptoms, the state of the patient, the short time which is at his disposal for the formation of an opinion and the reluctance of the patient to submit to measures which, however desirable from a scientific point of view, do not conduce to his greater comfort and which it is sometimes difficult to persuade him will aid in his recovery. On the other hand there is the pure clinician, a man accustomed to the nice balancing of probabilities, an art which he has raised to a high level; to such a man many of the methods of the pathologist are repellant as savouring too much of the mechanical, and he is sometimes only too delighted when he is able to catch a pathologist tripping. To the pure clinician the proper sphere of the pathologist is in the dead-house and for the rest he may amuse himself with his test tubes, but that is not medicine; in the practice of men of such a temperament the help of the pathologist is only called for at about the same time as that of the clergyman. As is usual in such cases the truth lies nearly midway between the two extremes: pure clinical work without modern pathological methods is for the most part pure guess-work, very skilful guess-work, no doubt, in many cases, but guess-work all the same; on the other hand, pure pathology without clinical methods would in any case be a groping in the dark, and the best it could arrive at—a very good best, however—is the broad fact that a patient is suffering from such and such an infection or such and such a blood disease; how that disease is affecting his prospects of life, what chances he has of complete recovery and what measures of relief are to be adopted are things which, as a rule, only clinical methods and clinical experience can tell one. It is probably a true proposition that a pathologist of the purest, steeped to the eyes in vaccine therapy, would not scorn the aid of such a triumph of empiricism as an expectorant mixture if he were suffering from bronchitis.

I have thought it would be of interest to record a few cases in which clinical signs were either fallacious or failed, from the absence of guiding symptoms, to give one a clue to the patient's condition, and in which pathological methods cleared up the diagnosis. The first case is that of a soldier who had not been abroad for thirteen years and who developed symptoms closely resembling those of typhoid fever—onset gradual with headache, epistaxis and slight bronchial catarrh, continuous temperature for some three weeks, during the last week of which the temperature was intermittent and fell by lysis. For the rest the pulse was persistently slow; the tongue was of the small red type, thickly furred along the dorsum and clean at the edges, and the stools were at times "pea-soupy" in character. Several observers thought that they recognized rose spots on the abdomen during the second week; the patient's general aspect was dull and placid, very much as one usually sees it in a mild case of typhoid fever. After a short interval of apyrexia the temperature rose again and the patient presented all the appearances of a relapse. He developed a slight pain in the region of the gall-bladder which might have been due to cholecystitis in a mild form. So far the clinical signs had been those of a typical mild typhoid fever; blood culture, however, gave sterile results on three occasions; there were no agglutinins for typhoid bacilli present at any time, leukopenia was not present, and culture of the stools and urine failed to demonstrate any typhoid or paratyphoid bacilli. A few days after the commencement of the apparent relapse there was a slight leucocytosis (12,000) and the liver was found to be enlarged upwards to the extent of one inch in the nipple line. X-ray examination showed restriction in the movements of the diaphragm on the right side, and in its descent the diaphragm showed a very distinct wave-like elevation at one part; puncture of the liver revealed liver abscess. It is to be noted that the man had not been abroad for thirteen years and nearly up to the end showed no signs or symptoms referable to the liver, so that one might be excused for being slow in coming to the suspicion that amœbic infection of the liver was the cause of the trouble. Here pathological findings served chiefly to keep one uneasy as to the tentative diagnosis of typhoid fever, and it was not till leucocytosis occurred that they helped to point towards the real cause of the trouble.

In another case, that of an officer who had apparently recovered from an operation for removal of a tuberculous kidney, symptoms arose which were diagnosed by some very eminent London physicians as typhoid fever; pathological investigations entirely failed to support this view, and the officer eventually died from general tuberculosis.

We have had two cases at the Queen Alexandra Hospital in which pathological methods led to the discovery of unsuspected typhoid fever. One was the case of a man who was under treatment at Rochester Row for gonorrhœa; he had also had syphilis and while in hospital he developed a severe syphilitic ulceration of the palate, fauces and tongue, and in addition a fairly severe bronchitis, his temperature was raised to about 103° F., and his pulse was rapid as one might expect with bronchitis and high fever; clinically his local troubles accounted fully for the fever. Blood culture, which was done in accordance with our routine practice in cases of fever, revealed the presence of typhoid bacilli. The case did badly, as one might expect with so many troubles, and he died in about a week. In another case, the patient, an orderly in the Royal Army Medical Corps, was admitted with high fever, cough, pain in the right side, and rusty sputum; the pulse was rapid and there was evidence of consolidation at the right base with fine crepitations. He was delirious and his general condition suggested the possibility of meningitis in addition to the obvious pneumonia; routine blood culture revealed the presence of typhoid bacilli: he was treated with a vaccine made from his own strain and his condition very rapidly subsided into that of a mild case of typhoid fever, from which he recovered.

A further case of an officer shows how clinical signs may lead one astray. Some ten days after a slight operation on the nose (removal of a spur) he developed fever with pain and swelling in the joints. The pains flitted about from joint to joint, and he had symptoms of pericarditis and endocarditis. There was a very strong family history of rheumatism; the diagnosis, based on clinical grounds, was acute rheumatism. He was ill for some months, then became apparently convalescent and was sent to Osborne, still suffering, however, from mild pains in his joints and occasional swelling. After a few days at Osborne all his symptoms returned with, in addition, acute pains in the loin and abdomen and he was transferred to the Queen Alexandra Hospital. Examination of the urine showed the presence of pus and culture gave a pure growth of *Staphylococcus aureus*. He was treated with a vaccine of his own strain and responded very well indeed. In a short time the fever and pain in the loin had gone and his urine rapidly cleared up; coincidently he lost the pains in his joints from which he had suffered since the commencement of his illness four or five months before, and the joint troubles have not returned since, although some six months have elapsed. Although it is impossible to speak very definitely about a case which one did not see from the beginning, it seems very probable that the joint and heart lesions were not due to acute rheumatism, but were an expression of a staphylococcic septicæmia. There was a continuous history of illness beginning ten days after the operation on the nose, the joint pains and swellings were not influenced by salicylates, and he did not make any material headway till he was treated with a vaccine from his own germ, when he very rapidly lost, not only the immediately urgent symptoms of pyelitis, but also his joint troubles, and for the first time began to gain instead of lose weight.

In other cases clinical signs fail to give one any guide as to the nature of a patient's disease. An officer in the Royal Army Medical Corps, a worker in a pathological laboratory, who had not been abroad for some years, developed signs of general ill-health of somewhat slow onset. After a while he noticed that his evening temperature was going up to 100° F. to 101° F., and he had drenching night sweats. Clinical examination failed to reveal any cause for the fever; tuberculosis naturally occurred to one's mind, but there was no evidence of that in the lungs or elsewhere. A streptococcic septicæmia also seemed possible; all the organs appeared normal, the liver and spleen were not enlarged, and there was no evidence of cardiac lesion; blood culture and culture of the urine gave negative results, there were no parasites to be seen in the blood, but a differential count of the white corpuscles showed a very definite increase in the mononuclear elements, and the serum gave an agglutination reaction with *Micrococcus melitensis* in high dilutions. The case ran the course of a mild attack of Malta fever, and the patient recovered in about six weeks. Here the fact that the patient was working in a laboratory was of some assistance in pointing to the diagnosis, though he had not himself been working with *M. melitensis* for a long time. But in another case of the same kind there was no guide of that sort. An officer in the Pay Department developed evening fever with copious night sweats; this was accompanied by a troublesome cough, especially at night; he had not been abroad for seven years. Malaria was suspected by the officer who first treated him, and the patient took considerable quantities of quinine for about six weeks without deriving any benefit from it. The persistent troublesome cough with scanty expectoration suggested the likelihood of tubercle of the lung, but repeated examinations of the sputum failed to reveal any tubercle bacilli, and physical examination of the chest showed nothing but a few râles scattered all over the bases of both lungs. There was no evidence of liver abscess or of suppurative lesions in other parts. Blood examination resulted in the finding of a large increase in the proportion of mononuclear cells without any increase in the total number of leucocytes, and the serum agglutinated *M. melitensis* in high dilutions; the diagnosis was Malta fever; he was treated with an appropriate vaccine, and after about four weeks more of hectic fever, the patient, after a rather larger dose of vaccine than had been given previously, developed a high temperature with rigors and considerable general disturbance. This attack subsided as quickly as it appeared, and from that time on the fever ceased and the patient recovered rapidly. A similar termination to Malta fever has been noticed by other observers.

In another case a girl developed repeated attacks of high fever of a hectic type accompanied by acute pains along the shafts of the bones; these continued for some months with intervals of freedom from pain and fever, but with progressive anæmia and deterioration of the general health. The suggestion was a septicæmic condition of some kind, but blood cultures gave negative results, and, on the other hand, examination of the blood showed an extreme anæmia with leucocytosis (20,000), about 80 per cent of the white cells being lymphocytes of the large variety; the diagnosis was chloroma.

Finally, since confession is conducive to a due humility, I would relate an incident showing the danger of giving an opinion based on a single examination and clinical signs alone. An officer of middle age came to me one morning complaining of general debility of some weeks' duration, with occasional nausea; he had been holding a responsible post requiring very hard work, and had not had a holiday for some time; latterly, without any other very definite symptoms, he had found that the work was getting too much for him, and he was easily tired; he was obviously "run down," but was not particularly pale, and so far as he knew he had not lost weight. Apart from neurasthenia from overwork, the usual things that such symptoms in a patient of middle-age suggest are: tubercle, cancer, granular kidney, and diabetes. A careful physical examination, however, gave no evidence of any of these diseases, and his urine was apparently quite normal. As he was leaving the station it was not possible to make any more observations, and I told him he was probably suffering from overwork and wanted a holiday. About six months later he wrote to me that he had become steadily worse since he saw me; he had seen several doctors who had given different opinions, had been to a spa where his condition was labelled " congestion of the liver! " and eventually got into the hands of a well-known hæmatologist who discovered that he had pernicious anæmia. It is impossible to say that his blood would have shown evidence of the disease at the time I saw him, but I regret that the examination was omitted, and can only plead that there was nothing in his appearance to suggest anæmia at the time, and that the conditions under which he was seen did not allow of any more than a single observation. The incident serves as a lesson on the unreliability of consulting-room diagnosis.

These few cases, taken from the experiences of the last two years, show, I think, that it is impossible to practise medicine properly without having constant recourse to the help of the pathological laboratory, that such work is not a luxury, as is so often thought, but is absolutely essential to correct diagnosis, and that diagnoses made without such aid are in very many cases pure guesswork, whether they are done in a sixpenny dispensary or in Harley Street itself.

Editorial.

THE NUTRITIVE VALUE OF BREAD MADE FROM DIFFERENT VARIETIES OF WHEAT FLOUR.

THE view that bread made from certain flours produced by different methods of milling, or subjected to different degrees of "purification," may possess many dietetic advantages, having lately been brought into considerable prominence, the Local Government Board directed Dr. Hamill to prepare a report summarizing the the principal scientific and technical information available on these matters. Dr. Hamill's report first gives a brief account of the different varieties of wheat flour produced at the present day; then indicates the nature of the chief chemical and physiological evidence which is at present available as to the dietetic values of flours and bread made therefrom, and finally makes reference to the position in these respects of so-called standard flour and bread.

CLASSES OF WHEAT FLOUR.

The wheat grain from without inwards consists of (1) the pericarp with testa and nucellus forming the branny envelopes of the grain; (2) the aleurone cell layer, rich in protein but free from starch, forming the outer layer of the endosperm; (3) the parenchymatous cells of the endosperm, which form the bulk of the grain and are packed with starch grains; they also contain protein from which gluten is formed; (4) the embryo or germ which lies at the base of the grain.

The object of milling is to break up the grain into fine particles so as to render possible its conversion into bread. The entire grain may be ground up and used as such for bread-making, and to this product the name of *wholemeal* is commonly given. A portion of the husk may be removed, when the resulting product is frequently known as *fine meal.* Ordinary white flour is obtained by the removal of as much of the outer envelope and cellulose portions of the grain as possible. The ideal of the miller is to produce a flour consisting only of the parenchymatous cells of the endosperm. In practice, however, perfect separation is never attained, and flour always contains other portions of the wheat grain. By modern methods of milling 70 to 73 per cent of ordinary white flour can be obtained from an average cleaned wheat.

Fifty years ago flour in this country was produced entirely by stone-milling. In this process the wheat is ground between stones arranged horizontally, the lower usually being stationary and the upper revolving. The opposing surfaces of the stones can be separated to any desired extent so as to enable the wheat to be crushed to any required degree of fineness. In low grinding the stones are close together and the wheat is reduced at once to whole meal. By sifting this meal through meshes of different degrees of fineness a separation can be effected into: bran; pollard (bran in a finer state of division); middlings (mixtures of finely divided bran, fluff and fibre, and fragments of germ); and flour. Only the softer wheats with tough skins are suitable for stone-milling; hard foreign wheats with brittle skins cannot be satisfactorily milled, as owing to the great attrition produced by the stones the skin is pulverized and a proper separation of the bran becomes impossible.

In roller-milling the wheat grain is reduced to flour in gradual stages during which the *offal*—i.e., products other than flour—is removed by sifting and by the use of air currents. As the attrition is not so great between the rollers any variety of wheat can be used in roller-milling. The wheat is first cleaned and conditioned by washing with water, after which it passes through a series of rollers, generally four in number, called break rollers. They are made of fluted chilled iron and are run in pairs in the same direction at a differential speed. The crushed product from each pair of rollers before passing to the next is sifted. The products obtained are termed coarse and fine semolina and coarse and fine middlings. These are passed through purifiers, in which the light branny and cellulose particles are removed by currents of air; the heavier particles pass through the meshes of a sieve and the particles of intermediate gravity pass over the tail of the sieve and are removed as finished offal, or subjected to further treatment. The purified middlings and semolina now pass through to a series of rollers, twelve to twenty in number; these are similar to the break rollers, except that they are smooth and are run at a less differential speed. The product from each pair of rollers, before passing to the next, is led through a "dressing" machine called a "centrifugal," where the flour is sifted out. The flour obtained from the first few reduction rollers (top of the mill) is generally classed as high grade flour, whilst that obtained from the remaining reduction rollers and also that from the break rollers come under the category of low grade flour. Ordinarily, in roller-milling 70 per cent. of the cleaned wheat is obtained as flour. Roughly, white flour may be divided into "whites," or "patents," which is a high grade flour, and "households," which is a lower grade. "Patents" represents the flour from the first few reduction rollers and constitutes about 50 per cent of the total output; the remaining 50 per cent of the flour, from the lower reduction rollers, may be taken as representing the household grade. When the whole of the flour produced in a mill, with the possible exception of 2 or 3 per cent of the lowest grade, is mixed together, it forms what is known as "straight-run" or "straight-grade" flour.

In stone-milling it is probable that, owing to the grinding action of the stones, some of the germ passes into the flour. Roller-milled flour, on the other hand, may be regarded as practically free from germ, as in its passage through the rollers it is flattened rather than ground up, and part of it is removed during the dressing of the flour.

Millers were formerly averse to returning the germ to flour, believing that it interfered with the baking and keeping qualities of the flour. Of late, however, certain millers have found that so long as the flour does not contain an excessive amount of moisture, 2 per cent of germ may be added without impairing the keeping qualities or altering the appearance of the flour. The presence of the germ imparts a nutty flavour to the bread. The so-called "germ flours" contain as much as 25 per cent of germ, which before being mixed with the flour is heated to destroy its enzymic activity.

THE NUTRITIVE VALUE OF VARIOUS MILLING PRODUCTS (MEALS AND FLOURS) AND BREAD MADE THEREFROM.

Chemical Composition of Wheat and Flour.—Wheat from different parts of the world varies in composition, the difference depending on the varieties of the wheat and upon the climatic and other conditions under which they are grown. The water varies from 7 to 14 per cent; the protein from 8 to 17 per cent; the dry gluten from 2 to 14 per cent; the carbohydrates from 65 to 76 per cent. Hence it is obvious that flours can be compared only when they have been obtained from the same wheat.

On comparing the milling products from the same wheat, it is found that the high grades (patents) contain less protein than the lower grades. Straight-grade flour is intermediate between patents and low grade flour. The carbohydrates usually decrease as the protein increases. The ash varies in the same direction as the proteins, being greater in low grade flour.

When judging bread, it must be remembered that flours vary in their power of absorbing water, and a flour relatively rich in protein by absorbing more water may yield a bread containing less protein than bread derived from flour relatively poor in protein. High-grade flour (patents) has a greater water-absorbing capacity than lower grades.

The caloric value of flour can be calculated in the usual manner—one gramme of starch yielding on combustion 4·2 calories, one gramme of vegetable protein 5·9 calories, and one gramme of fat 9·3 calories. The caloric value of bread is approximately five-eighths of the caloric value of the flour from which it is made.

The Germ.—On analysis one-third of the germ is found to consist of protein, one-third of carbohydrates, and one-sixth of fat, the remaining one-sixth consisting of water and mineral matter.

It seems probable that wheat does not contain more than 2 per cent of actual germ, so that if the whole of this germ were included in the flour the protein content of this flour would be raised by about 0·6 per cent. In the special flours known as "germ flours," a large amount of germ is added, not merely the amount lost during the milling of the flour, and the additional protein may amount to as much as 4 or 5 per cent.

Nature of the Proteins in Wheat.—The proteins of wheat are a globulin, an albumin, and a proteose, together with gliadin and glutenin, which in the presence of water forms gluten. The average amount of nitrogen in the protein of wheat is about 17·6 per cent, so that the proper factor for determining the total protein from the amount of nitrogen found is 5·68 instead of 6·3, the one usually employed in food analysis.

The composition of the protein in the germ differs from that in the rest of the wheat grain. The germ contains no gliadin or glutenin; it contains 10 per cent of albumin, 5 per cent of globulin, and 3 per cent of proteose. There is also a considerable quantity of nucleic acid in combination with albumin and globulin.

Mineral Matter.—The residue obtained on incineration of wheat and flour is termed the mineral matter. The mineral content is between 1·38 and 2·35 per cent of the grain; about half the ash consists of phosphorus (P_2O_5), and it is probable that it occurs in the grain in organic combination as nuclein, lecithin and other phospho-organic compounds. Only 20 per cent of the mineral matter of the grain is present in the straight-run flour, 74 per cent being removed in the offal.

The amount of mineral matter in bread depends upon the mineral content of the flour from which it is made, but is also influenced by the quantity of water present in the bread, and the addition of salt, potatoes, &c. There is, therefore, no fixed relationship between the mineral content of the flour and of the bread made from it. The bread commonly contains about half as much mineral matter as was present in the original flour, but nearly half of this mineral matter may consist of salt added during the baking process.

PHYSIOLOGICAL CONSIDERATIONS.

Digestible Nutrients and Available Energy of Bread from Different Flours.—The chemical data give some indication of the food value of bread made from various flours. It is not, however, possible to base conclusions as to the nutrient value of different breads upon the chemical data obtained from analyses of the breads or the flour from which they are made. The degree to which bread is acted upon by the digestive juices and the extent to which the products of digestion are absorbed, also require elucidation. Experiments *in vitro* seem to indicate that patent grade flour is more easily acted upon by the digestive juices than either "entire" wheat flour or wholemeal flour. Actual feeding experiments on man have been carried out in the experiment stations of the United States Department of Agriculture. Apparent digestibility was measured by the difference in the composition of the food taken and of the fæces excreted. The results of the experiments showed that the proportions of digestible protein and the amount of energy available to the body were greater in the straight-run flour than in the entire or wholemeal flour. The latter contained the lowest percentage of digestible protein and available energy. No sensible difference in digestibility between straight-run and patent flour could be observed. The differences in nutritive value between various grades of flour made from the same wheat were insignificant when compared with the differences in nutritive value of flours made from wheats differing widely from one another in composition.

As regards fat, the amount in flour is so small that the variations which occur in different grades of flour are of little account from a dietetic point of view. Removal of the germ from the flour diminishes the fat content, but the diminution is hardly appreciable.

The protein contained in the germ is as digestible as the protein of straight-run flour, but apart from general dietetic considerations there appears to be some evidence that the germ may contain substances of special dietetic value in cases where the diet is mainly restricted to bread. The protein of the germ is of a different nature from that contained in flour from the endosperm.

The mineral matter in an ordinary mixed diet amounts to about 20 grammes daily, but since mineral substances are absorbed and also excreted by the intestine it is impossible by a mere comparison of intake and output to ascertain how much has been really absorbed and assimilated. Although practically no data are available as to the total mineral requirements of the body, investigations have shown that 0·9 to 1·5 gramme of phosphorus, 1 to 1·5 gramme of lime, and 10 milligrams of iron would meet the daily requirements of the body. Assuming that the elements are absorbed in the proportion in which they exist in the ash of bread it would appear that the requirements of the body as far as phosphorus and iron are concerned would be met by white bread, when taken in amounts which may roughly be considered sufficient for daily needs of nitrogen and energy. Bread made from entire wheat flour and wholemeal bread would, however, furnish a more generous supply of both phosphorus and iron. Both white bread and wholemeal bread are deficient in calcium.

Experiments recently carried out at Cambridge show that rats fed on white bread did not thrive as well as those fed upon a diet consisting of wholemeal bread only. Leonard Hill has obtained similar results with rats fed on white flour and flour containing a variable proportion of finely ground offal.

SO-CALLED STANDARD FLOUR AND BREAD.

In wholemeal prepared from an average wheat the coarse branny particles amount to about 20 per cent of the whole grain. A flour from which this bran has been removed, therefore, amounts to 80 per cent of the grain. It contains the whole of the contents of the endosperm cells, the germ, and a certain amount of finely comminuted branny particles and cell walls of the endosperm. Flour of this kind is commonly known as "80 per cent" or "standard" flour.

So-called "standard" flour can be prepared either by stone or roller-milling processes. The wholemeal produced by stone grinding operations is subjected to sieving whereby coarser branny particles to the extent of 20 per cent of the wheat are removed, the resulting flour amounting to about 80 per cent of the wheat milled.

When "standard" flour is prepared by roller-milling, it is usual in order to avoid extensive alterations in the machinery, to subject the wheat to practically the same series of processes as in the preparation of an ordinary 70 per cent straight-run flour. In order to obtain an 80 per cent flour the offal formed in the break roller system is removed. This amounts to somewhat under 20 per cent of the whole grain and consists of bran and pollard. The offal which is ordinarily removed during the process of reduction is returned to this flour, with the exception of the larger branny particles, about 2 per cent of the grain, which are rejected. The resulting product is an 80 per cent straight-run flour containing the fine branny particles (offal), fibre and the germ in a flattened and broken condition. The offal with the germ is usually passed through closely corrugated rollers known as "scratch" rollers in order to break it up as finely as possible before allowing it to pass into the flour. It is, however, possible to make an "imitation standard" flour by adding the requisite amount of finely divided offal to "households" or other commercially low-grade flour. Such an imitation flour can be made at a less cost and the pecuniary gain to the miller may be considerable. Standard flour (regarded as an 80 per cent straight-run, together with the germ) has advantages over the "imitation standard" in the palatability and appearance of the loaf made from it.

In order to make a proper comparison between the composition of "standard" flour and other varieties such as "patents," "households," or wholemeal, it is necessary that the flours examined should be milled from the same wheat or wheat mixture.

GENERAL REVIEW.

In the final section of his report Dr. Hamill makes some general observations on the practical aspects of the question, as it at present appears. He states that the difference in nature and nutritive value between breads made from the different classes of flour does not appear to be of much importance to the average adult with whom bread is only one out of many varied constituents of his dietary. At the same time there is no doubt that some people who are accustomed to a mixed diet find that bread of one particular class suits them individually better than another. Suitability in this sense may be the result of the greater or less time required for mastication; the presence or absence of laxative properties, &c. No general rule can be laid down in such cases. The commercial supply of breads of all these classes serves a useful purpose by enabling a choice to be made.

If the question be asked what variety of flour is best suited for the diet of those adults whose food consists principally of bread, Dr. Hamill would answer that a diet which consists principally of bread, from whatever grade of flour it may be made, is unsatisfactory, and that it is more important for those who for one reason or another are in this position, to secure a greater variety of diet—which does not always mean greater cost—than to rely upon the selection of any particular form of bread, however nutritious.

Dr. Hamill's researches have shown no reason to consider that varieties of bread which the miller and the baker have accustomed us to regard as of lower quality, "households" for example, are in any physiological sense inferior to the higher priced bread made from specially white flour. On the contrary, from the point of view of nutrient material and energy value, the advantage is on the side of the "households." Entire wheat flour, including stone-ground flours and "standard" flour, are in nearly the same position as "households," but they have special additional constituents, due to the presence of branny particles and the germ of the wheat, which appear to have a value of their own in nutrition, and may as a result of further investigation be shown to contain organic compounds of phosphorus, or other substances, the presence of which in some part of the dietary is important in maintaining good health.

As to the choice of bread for children, the same considerations as to the dominating importance of a varied diet apply. Dr. Hamill, however, thinks that in the case of children, who live largely on bread, or bread supplemented only by jam, sugar or other foods which add little to the available mineral matter, proteins, organically-combined phosphorus or other substances which possibly may be necessary for health, there appears, on the balance, to be advantage in the use of bread made from flour of the "entire" wheat class, or from wholemeal in which the bran is very finely ground. Dr. Hamill pertinently observes that many children whose food consists largely of bread do not get enough of it and are really underfed in respect of such essential nutritive substances as proteins and carbohydrates. To increase the quantity of bread in such cases may be of greater importance than the substitution of one form of bread for another; to supplement the bread by other articles (such as milk) which contain a material quantity of protein, mineral matter, and organically-combined phosphorus, would be still more useful.

Clinical and other Notes.

SOME RECENT FACTS AS TO ENTERIC INOCULATION IN INDIA.

By Colonel R. H. FIRTH.
Royal Army Medical Corps.

On the principle that it is better for men to be posted up with recent figures rather than that they should have to wait for the publication of official returns, the following brief statement of the position as to enteric fever and inoculation in the European Army of India is submitted. The facts refer to the first six months of 1911.

In that period we had, in all India, 112 cases of enterica, with 6 deaths among the protected men, and 45 cases with 4 deaths among the non-protected. The protected population we know to have been 63,624 persons, and the non-protected population to have been 8,481 persons. From these data, we find the case incidence per 1,000 among the protected to be 1·7 and among the non-protected to be 5·3. If we take the mortality and express it as per million, then the ratio for the protected is 94, and for the non-protected it is 471. That is to say, the incidence of enterica for the half-year was roughly three times as great among the non-protected as among the protected, while the mortality was roughly five times as great among the non-protected as among the protected. These figures are as encouraging as they are interesting, and may be of use to those engaged in giving addresses to men on the importance and need of submission to the procedure of inoculation.

EXTEMPORIZED STRETCHER AND ADAPTED CART.

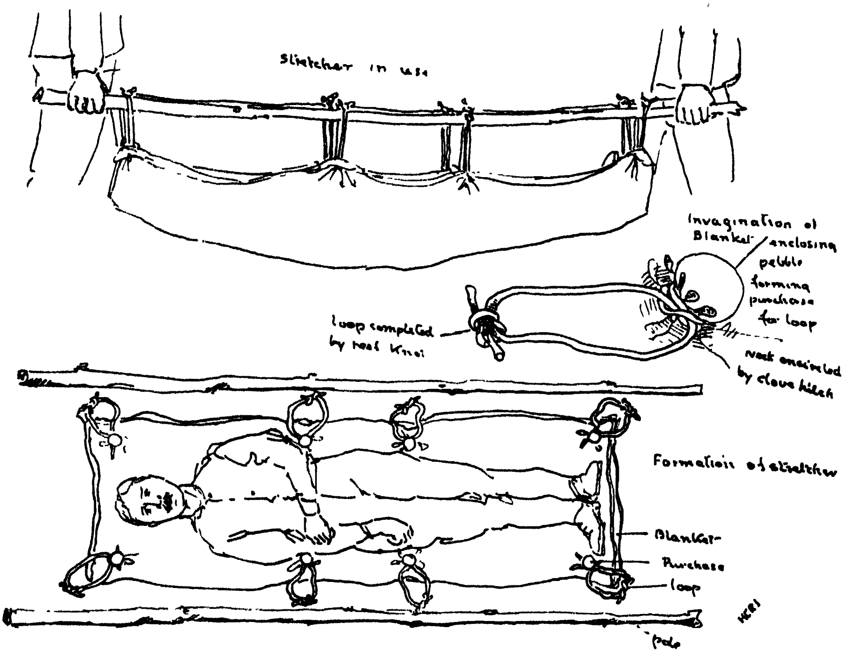
By Major J. P. SILVER.
Royal Army Medical Corps.

The Stretcher.

Materials.—One Service blanket, two poles not less than 7 ft. long, or lances; eight pieces of small rope about 4 ft. long; eight stones or rolled up handkerchiefs, compressed balls of paper, pieces of straps, &c., rolled into rough globes about one inch or one-and-a-half-inches in diameter.

The blanket is laid on the ground and folded lengthwise. At each corner and at points on each side of the blanket, which when a patient is placed on the completed stretcher are about three inches above his iliac crests, and just below his trochanters, a stone is pushed up into the blanket from below. Round the neck of the pouch thus formed, the centre of one of the ropes is tied with a clove-hitch. The free ends of the rope are then tied with a reef-knot to form a loop; eight loops are thus formed as shown in the diagram. The loops at the head end should be just large enough to allow the poles to slip through them, the remainder should be longer, the lateral ones allowing the stones to hang five inches or more below the poles. The length and position of the loops can be altered at once to suit the patient after he is laid on the stretcher. The poles are passed through the four pairs of loops as seen in the diagram.

It is also possible to carry the patient with one pole only, but in this case the blanket is not doubled. It is rather broad when not folded, and to counteract this the stones are placed further from the edges. With a little practice men soon learn the proper adjustment of the loops and stones.


Stretcher in use
Invagination of Blanket enclosing pebble forming purchase for loop
loop completed by reef knot
Neck encircled by clove hitch
Formation of stretcher
Blanket
Purchase
loop
Pole

The Advantages of the Stretcher are: It can be made in a few minutes. It is warm, as the patient sinks into the folds of the blanket—slightly in the case of the two-pole stretcher, while he is practically enveloped in the one-pole stretcher and protected from wind and rain.

SCOTCH CART ADAPTED FOR SITTING-UP CASES.

Materials.—Two boards, one foot to eighteen inches broad, and about one-and-a-half inches or more in thickness, long enough to project a few inches beyond the front and rear ends of the cart; two similar boards, long enough to project a few inches over the sides. Hammer, nails and saw.

The boards are nailed together to form a square which just fits within the cart, while the free ends project at each end and at the sides.

The upper tail, front, and side boards of the cart, which are each held in position by two long iron rods passing through iron slots in the lower boards, are removed. The square above described is placed in the cart, its projecting ends resting on the fixed sides of the cart. The four pieces of the cart which were removed are now replaced, when their iron rods will effectually prevent any motion of the oblong boards.

This method of equipping such a cart is frequently employed in Scotland for country school treats, &c.

Advantages.—This form of cart is in general use in town and country. The materials for its equipment are easily procured, and can be very quickly fixed together. One horse will draw the cart over the roughest country. A number of such carts could be employed as feeders to ambulance wagons, motors, &c., stationed on the road.

Disadvantage.—The cart has no springs.

The carts vary in size—each one will hold six patients or more.

FIELD COOKING.

By Lieutenant and Quartermaster C. W. KINSELLA.
Royal Army Medical Corps.

During the recent Camp of Instruction held at Tidworth Park, some experiments in field cooking were tried, an account of which may be deemed worthy of interest.

A supply of paper bags, of assorted sizes, was purchased from the *Daily Express* and taken into use, and although cooking in paper is no new thing, the trials made established the facts that the bag form ensures the fullest retention of the nutritive qualities of the food, there is an absence of shrinkage, no basting is necessary, while less time, and consequently less fuel is necessary; as the cooking is automatic the dishes do not require watching whilst in the oven. Before being used the bags were greased inside with dripping or butter; when filled the top end was folded over two or three times and fastened with a paper clip, and the bottom corners of the bag were turned up.

The dishes prepared and cooked in this manner included:—

(1) *Ham and Eggs.*—The ham rashers were cooked for five minutes, the bag was then taken out, and a trapdoor snipped in the top side of the bag, through this the eggs were passed and the whole cooked for a further three minutes. The contents of the bag were then allowed to slide on to a dish, and proved excellent eating.

(2) *Roast Joint.*—A 9 lb. joint of meat was placed in a large sized bag and cooked for one and a-half hours, a juicy and tender joint resulting.

(3) *Stewed Steak.*—Beef steak was cut into thin slices, floured, and placed in a bag with half a cupful of minced carrots and a cupful of water, and cooked for fifty minutes; this made a savoury stew.

(4) *Mutton Cutlets.*—The chops were trimmed and floured, and cooked for eight minutes. They turned out juicy, succulent, and full of flavour.

(5) *Mess-tin Ration.*—A man's ration was taken, cut into small cubes and sprinkled with flour, pepper, and salt, and some chopped onion added; it was then placed in a bag with a cupful of water. A little water was placed in the bottom of the mess-tin (to prevent burning) and the tin placed on a twig fire; a savoury stew resulted.

Though the best results were obtained when using the "stove, portable," supplied for field ambulances, some quite good results were obtained in the Aldershot field oven and in camp kettles.

Lieutenant-Colonel H. E. R. James, C.B., R.A.M.C. (retired), kindly furnished us with some recipes from the dietary of the French soldier. The somewhat premature break-up of the camp prevented these being tried in their entirety, but the following were made, and for a system of "squad cooking" with a squad of four men to each dish, were found very suitable and appetizing, viz.:—

(1) *Soup à la Minute.*—(For four men.)

Take:—

Dripping (or lard)	2 tablespoonsful.
Flour	2 cupfuls.
Onions	2 large or 3 medium.
Water...	4 mess-tins, three-quarters full.
Bread	4 half-rations (2 lb.).

Overnight melt the dripping in a camp kettle lid, add onion chopped up, sprinkle in the flour, and incorporate; allow to cool.

Morning, put the water on to boil, cut the above mass into four pieces; each man takes a piece and softens it in the warm water in his mess-tin, when the water boils throw all four portions into a camp kettle and boil for ten minutes. Then chop up the bread and put it into the mess-tins, pouring the soup over it. This made a most sustaining broth.

(2) *Quenelles of Flour.*—(Four men.) Time forty-five minutes:—

Flour	5 tablespoonsful.
Salt...	⅓ ,,
Water	½ tumbler.

Put the flour into a mess-tin, add a little salt and water and stir till it makes a moist paste.

Put two mess-tins of water into a camp kettle, add a teaspoonful of salt and boil; when boiling throw in pieces of the paste the size of a walnut and boil for about ten minutes; when they rise to the surface they are done. An excellent substitute for bread or biscuit.

(3) *Potatoes à la Paysanne.*—(Four men.) Time thirty minutes:—

Peeled potatoes	1½ mess-tins full.
Lard, and onions, of each	2 tablespoonsful.
Salt...	½ ,,
Water	1 mess tin full.

Peel the potatoes, wash and cut up into four or six pieces, and chop onions fine. Frizzle the lard in a camp kettle lid, add the onion, brown, and then add the potatoes, seasoning with salt, add water till potatoes are completely covered and keep boiling for twenty-five minutes, adding water as necessary; very savoury.

(4) *Pilaff de Bœuf.*—(Four men.) Time one and three-quarter hour.

Beef	4 rations.
Lard	2 tablespoonsful.
Onions.	2 large, or 3 small.
Rice	½ tumbler.
Water	2½ mess-tins.

Bone the beef and cut into small pieces, chop the onions and wash the rice. Melt the lard in the camp kettle, add the beef while stirring, season with salt and add the onion chopped, cover with water and boil for one hour, then add the rice and boil slowly for a further thirty minutes. An appetizing stew.

The net results obtained were that the cooks were stimulated to an interest in the dishes outside the usual routine of camp stews, and the consumers welcomed the change in the usual dietary. Further extensions in this direction might, I consider, be added to the cooks' existing curriculum.

NOTE ON A CASE OF MALARIAL FEVER CONTRACTED IN ENGLAND.

By Captain A. B. SMALLMAN.
Royal Army Medical Corps.

Infection by the malarial parasite may be as rare in England as is usually supposed. It may, on the other hand, be a more common event. Either supposition would appear to offer sufficient justification for making a note on the case cited below.

Private H., aged 21, service nine weeks, was admitted to the Royal Herbert Hospital, Woolwich, on July 11, 1911, complaining of headache. He gave a history of having been away on furlough at Tottenham for the previous ten days, during the whole of which time he had been ill with headache, and also, it was elicited, with fever.

When seen at the inspection room he had a temperature of 105°, but by the time he was examined in hospital it had fallen to 102·8°. The tongue was furred, there was a palpable spleen, and some cough. Otherwise, no signs or symptoms were made out. Enteric fever was thought of, though the history of a sudden onset was against it, and preparations were made to obtain a culture from the blood in the evening. By 6 p.m. the temperature had fallen to 99°. A culture was, however, made, 5 c.c. of blood being introduced into a large quantity of broth.

The following morning, the 12th, the temperature had again risen to 102·6°, and the patient was in a rigor when seen. A blood-film was taken which showed benign tertian parasites in all stages, from the ring form up to the fully formed rosette. He was given calomel, and later in the day quinine. The sulphate was given by the mouth in doses of 10 grains thrice daily. By the following morning the temperature had fallen to normal, and it has remained so since. The blood culture showed no growth.

His residential history is as follows: Born in Hammersmith, he left that place as quite a small child and went to Acton, where he has lived ever since, until 9 weeks ago, when he came to Woolwich on enlistment. He has not left Woolwich since, except for one day when he went to Acton. He has never been out of England and has never previously suffered from the disease.

It seems pretty obvious that the infection was acquired in Woolwich, though he says he has visited the docks in the neighbourhood once or twice, on each occasion returning to barracks by 9.30 in the evening, he does not remember having been bitten by mosquitoes.

The interest of the case lies in the possibility of the disease again spreading widely in England. It is well known that malaria used to be common, it is well established that anopheline mosquitoes breed in England, there is a susceptible population, and many human carriers of the parasite are landed in the country every year. In addition, in these days of rapid transit, mosquitoes infected, say, in India, may be carried to England in time to enable them to infect fresh individuals here.

I am indebted to Lieutenant-Colonel R. J. S. Simpson, C.M.G., officer in charge of the Medical Division, Royal Herbert Hospital, for permission to publish the case.

THE ASEPTIC TREATMENT OF BURNS AND SCALDS.

BY MAJOR F. J. W. PORTER, D.S.O.
Royal Army Medical Corps.

THE treatment of these injuries by the ordinary methods of oily applications is most unsatisfactory. That by the use of picric acid may be less so, but I have no experience of it. I do know, however, that extensive scalds or superficial burns, owing to their always being infected when they come under treatment, usually suppurate. This leads to further destruction of tissue, and scarring is very apt to ensue. At any rate, these injuries when treated in the usual manner with oily applications, remain a very long time in hospital and convalescence is slow. Having lately seen an instance in which after a large scald (by boiling water) healing took no less than seventeen weeks, in spite of grafting, I determined to treat the next case I saw by strictly aseptic methods from the very commencement.

On May 1, Gunner D. was admitted to the Alexandra Hospital at Cosham, having slipped into a copper of hot water. The right leg was scalded as high as the popliteal space, but the fore part of the foot and anterior surface of the leg had escaped. He had been dressed with carron oil and lint before arrival. I injected $\frac{1}{4}$ grain of morphia and had him anæsthetized at once.

After removing the dressing, the whole of the limb was thoroughly washed with plenty of methylated spirit poured from a bottle and scrubbed by sterile swabs. The scalded surface was freely rubbed by the swabs, and all the denuded epithelium removed. At least ten minutes were occupied in this manner. The limb was then washed with iodine water, one drachm of tincture to the pint. After this, plain white sterile gauze was placed in contact with the raw surface and absorbent wool and a bandage over all.

Next morning the temperature was normal and the patient quite free from pain. There had been such considerable exudation that the dressing was saturated. I thought it advisable to remove the wool and apply fresh, but the gauze was not touched. This was done again next day, and the leg was then kept outside the bedclothes to promote evaporation, and to try and get the wound to scab. The leg was slung next day from a cradle and this materially assisted matters.

On the morning of the tenth day the cotton wool was removed and the gauze was found perfectly dry over the whole area, with the exception of a place over the inner ankle and centre of the calf; the gauze at these places was soaked with pus, but no organisms were present. Over the rest of the leg the abraded surface had healed beneath the gauze. After soaking it off, the limb was slung from a cradle exposed to the air for four hours and a sterile gauze dressing reapplied.

The gauze again became soaked with pus over the unhealed areas, and so all dressings were again removed and the abraded surfaces dusted with boric powder and the limb kept slung. Final healing took place about the thirtieth day.

The ultimate result of this method of treatment was, I think, considerably better than one would have got if the injury had been dealt with by oily or greasy applications, but I think it is quite possible that one might improve on it. The great obstacle to immediate scabbing is, of course, the tremendous exudation of serum which follows the injury, and this is much accentuated by the scrubbing which one makes use of in order to sterilize the affected area. It was suggested to me that it would be a good plan to have slung the limb from a cradle covered with gauze for a couple of days, but in addition to the risk of infection the exposure of a large raw surface to the air would cause intolerable pain.

Captain Adye-Curran's suggestion, viz., to employ continuous immersion until the bulk of the exudation had ceased, and then to apply a sterile dressing might be worth considering, but there would again be the risk of infection. Another plan would be to smear the part with sterilized vaseline before applying the gauze.

Extensive injuries of this kind do not occur very frequently, and I am therefore recording my results in this case in the hope that others may be induced to try some other line of treatment than the old-fashioned carron oil application.

I think if one had applied ointment to the small raw surfaces which were evident when the gauze was removed on the tenth day, instead of trying to get scabbing under boric acid, much more rapid healing would have resulted.

CLINICAL NOTES ON A CASE OF NEURITIS OF THE FIFTH NERVE EXTENDING TO THE GASSERIAN GANGLION.

By Captain W. S. CROSTHWAIT,
Royal Army Medical Corps.

Previous History.—Some years ago the patient had severe neuralgic headaches for about six weeks after influenza. He has also suffered a good deal from malaria in Burma, but not recently. His father died of gout, and he has had a typical attack of podagra. When on the way home from India he had retention of urine; and the ship's surgeon was unable to pass a catheter, and found it necessary to tap him above the pubes. The retention of urine was evidently due to urates. There is no history of gonorrhœa or syphilis. He caught cold in his face whilst out motoring yesterday, and neuralgia came on soon afterwards, but was not severe at first.

April 2, 1911. *Present Condition.*—I was called to see Major S. this morning, and found him suffering from acute pain radiating from the front of the ear along the upper and lower jaw as far as the middle line. The pain was limited to the right side of the face. There was some twitching of the muscles of the lower part of face on this side. There was no infra-orbital or supra-orbital pain. There was no pain over the mastoid process or in the ear, and there was no aural discharge. Temperature normal, pulse 60, tension very high, arteries appeared somewhat atheromatous. Specific gravity of urine 1032, reaction very acid, and there was a very large deposit of urates. No sugar or albumen.

Treatmĕnt.—A hot salt bag was applied locally, and the A.B.C. liniment was rubbed into the painful parts. Ten grains of aspirin was given every fourth hour, but as this did not relieve the intense pain, morphia ¼ gr., was injected; this had to be repeated about six hours later owing to the persistent pain. The patient slept for a few hours after this. *Diet.*—Milk and chicken broth, and Contrexéville water to eliminate the urates.

April 3, 1911.—Pain is still severe. Morning temperature normal, pulse 62, tension still very high, urine still loaded with urates. Evening temperature 100°. Given calomel 4 gr. to be followed up with Carlsbad salts 3 drachms in hot water in the morning. Given a draught containing bromide of potassium, tincture of opium and chloral hydrate to produce sleep.

April 4, 1911.—This draught did not relieve the pain very much. Morning temperature 100·4°, pulse 64. The tension is not quite so high; the bowels have been opened, urine still loaded with urates, and is very acid. There is a well-marked herpetic eruption extending from the front of the ear towards the nose, and along the upper and lower lips as far as the middle line, and a similar eruption is on the right side of the mucous membrane of the mouth. A mixture containing sulphate of quinine 5 gr., antipyrin 8 gr., and dilute sulphuric acid 5 minims, was given every fourth hour instead of the aspirin, in the hope of relieving the pain, which is still severe. Evening temperature 100·8°. A blood-film was examined for the malaria parasite, but none found. The sleeping draught had to be repeated to relieve the intense pain.

April 5, 1911.—Patient had a restless night. The upper and lower lips on the right side are very painful and swollen. The inside of the mouth on the right side is swollen, painful and dry, and it is very difficult for him to put out his tongue, which is thickly coated. The mouth is being washed out frequently with a solution of glycerine, borax, potassium chloride, and a little cocaine to relieve the pain. Given calomel 4 gr., followed by a dose of Carlsbad salts. Urine is still very acid. Specific gravity 1030, loaded with urates, no albumen.

April 6, 1911.—Patient did not sleep much owing to the pain. Temperature 100·4°, pulse 66, tension not so high. Mouth on right side very painful and tender, right upper and lower lip swollen and painful. He is unable to put out his tongue very far, but it appears to deviate slightly to the left when his mouth is closed and he smiles; the muscles on the left side of the face appear to contract better than those on the right. The patient can close and open his eyes all right; pupils react to light and accommodation; knee-jerks are present. On placing a pinch of salt on the anterior part of his tongue, and then a pinch of sugar, he is unable to distinguish the difference between the two, although he says the former is salt. Evening temperature 101·4°. The following pills and mixture were given to relieve the pain:—

℞ Butyl chloral hy.	gr. iv
Ext. gelsemii	gr. $\frac{1}{8}$
Fiat pil. Send	8

One every fourth hour.

℞ Ammon. brom.	ʒii
Sodii salicyl.	ʒii
Pot. cit.	℥ss
Tr. aurant.	ʒi
Aqua ad	℥viii

Sig. One ounce every fourth hour.

April 7, 1911.—The butyl chloral hyd. and the gelsemium pills given during the night relieved the pain but did not produce sleep. It was therefore necessary to inject morphia $\frac{1}{8}$ gr. with atropin. The patient had two hours sleep after this, and says he feels much better. Pulse 62, temperature 100·6°. Some pus is coming from the right side of the mouth, and the tongue is thickly coated. Given calomel 3 gr., followed by Carlsbad salts. Condy's fluid mouth-wash to be used frequently. Patient complaining of partial loss of sensation on the right side of the face, a singing in the right ear, and deafness. On examining this ear a small amount of wax was found mixed with blood. There was a certain amount of herpes about the auricle, extending slightly into the canal. On testing for nerve deafness with a watch applied to the forehead, temple, and close up to the right ear, the patient is unable to hear it ticking at all. The ear was syringed with a warm solution of bicarbonate of soda, and a small amount of wax removed.

April 8, 1911.—Patient had a fairly good night, and is at present free from pain. Pulse 66, temperature normal. On testing with cotton wool there is a distinct difference between the sensation on the right side of the face and that on the left. The urates are now disappearing from the urine, and it is not quite so acid. A dose of Carlsbad salts is being given every morning, and the Contrexéville water is being continued.

April 9, 1911.—Is free from pain to-day. Temperature normal, pulse 64, tension much lower. There is no deposit in the urine now. The following mixture was ordered thrice daily :—

℞ Pot. iodidi	gr. v
Liq. arsenicalis	♏ iii
Spir. am. aromat.	♏ xv
Aq. chloroformi ad	℥i

April 11, 1911.—Temperature remains normal, pulse 60, urine is now healthy.

April 14, 1911.—Patient has a certain amount of neuralgia still, and does not sleep very well. It is necessary to give him an occasional pill of gelsemium and butyl chloral hydrate.

Subsequent History.—Patient was sent to see Dr. R., of London, who agreed that there had been a neuritis of the fifth nerve extending back to the Gasserian ganglion, and he was of the opinion that the seventh nerve was not then implicated, but that the twitchings of the muscles of the right side of the face were reflex, and due to the neuritis of the fifth nerve. He recommended a rest cure at Osborne, and feeding up treatment, and then a change to the East Coast. On July 11, 1911, the patient had improved very much, and put on a stone in weight, but he had occasional twitchings of the muscles of the right side of the face, and a certain amount of neuralgia, but slept fairly well.

Remarks.—The disease was evidently brought on by a chill, and very likely would not have been so severe if the patient had not been a gouty subject. Morphia was the only drug that relieved the intense pain at all, the drugs usually recommended for a neuritis of the fifth nerve being useless. It seemed important to eliminate the uric acid from the system as soon as possible by means of Contrexéville water, Carlsbad salts, and suitable diet. Calomel was also useful; the slight temperature was no doubt due to the septic condition of the mouth. The seventh nerve appeared to be implicated as well as the fifth, at the beginning of the attack, although there was no facial paralysis when the patient left for Osborne. The pulse was very slow throughout, and the tension high at first. It was evidently the third or maxillary division of the fifth that was chiefly implicated. The nerve deafness cleared up completely.

NOTE ON A COMMON FORM OF HEADACHE SIMILAR TO BUT LESS SEVERE THAN MIGRAINE.

By Major C. F. WANHILL,
Royal Army Medical Corps.

Among the numerous forms of headache which are described there is one which is common among the officers and men of the army at home and abroad. Though of little importance from the point of view of danger to life, it however adds considerably to life's little worries and hence is worth some study. The subjects of this form of headache have usually a fairly good idea of its causes and the best method of combating it, but this they rarely do, unless the attacks are very severe and persistent.

The attack is often heralded by unusual clear-headedness almost equivalent to that induced by alcohol and gout, work being performed with the greatest ease which before required some effort. Within a few hours, however, this gives way to depression of the faculties and to a gradually increasing ache in the head. At first a tight feeling in the head or even pain at the back of the neck may be felt. The pain is usually unilateral and extends to the eyes and in some cases down the side of the face and neck, simulating neuralgia, with which it is liable to be confounded. The eyeball and the region of the supra-orbital nerve are also tender to the touch.

The symptoms increase in severity till it is impossible to tolerate light or sound. Nausea and vomiting may be felt and fortification figures seen with the eyes closed. The attack may become so severe as to compel the patient to go to bed and may even prevent his keeping still while there. In the worst cases the pain is intense, the increased pulsation of the heart making it of a throbbing character. Sooner or later the patient falls asleep and may wake in the morning without pain but with an aching sensation in the head on movement and a feeling of weakness and unsteadiness in the limbs.

In some cases the pain does not cease in the night, but is found to have moved to the opposite side of the head and may persist during the next day and night. It is rare, however, for the attack to last more than forty-eight hours.

Occasionally the patient wakes up in the morning with a slight headache which may increase during the day, reaching its maximum at night, or it may pass off. The symptoms are varied in different persons, but are usually sufficiently characteristic to allow each one to recognize the impending attack.

The symptoms are so similar to "intoxication" with alcohol or drugs as to allow this term to be applied to the attack. At home, the subjects of the disease will usually be found to be those who are engaged in sedentary occupations, especially after an active life, and who consequently suffer from some derangement of the digestion. Since the attack can never be traced to a particular meal it is probable that dyspepsia alone is not the cause. Visual defects will also produce headaches of a similar character, but when they exist they can be excluded by correction. The attacks come on, commonly, towards the end of the week and may assume considerable regularity. They may even occur daily, for some time, in the worst cases. If, as may be presumed, the disease is caused by absorption of some substance capable of producing an intoxication, the seat of the absorption is probably the large intestine. An attack may be started by the eating of some substance which produces irritation and possible absorption of the fluids from the large intestine. Thus a lady always had an attack after eating sugar-cane, while a doctor could produce one by eating onions.

The attack is usually followed by the passage of a stool, and, if this object can be attained before the attack becomes severe the symptoms often pass off. Those who are engaged in teaching or in sedentary employments are apt to be so absorbed in their work as to neglect the calls of nature. By the end of the week the accumulation of material in the intestine sets up irritation and an attack is the result. This may occur even if the patient has been to stool several times in the week, and the regularity of the week-end headache can often be broken if a suitable purgative be taken a little before the attack is expected. That the attack is not due to constipation only is probable from the fact that it is usually accompanied by peristalsis and can be produced artificially by taking an unsuitable purgative. If a saline is taken in the morning and only acts once or fails to act, but keeps up peristalsis all day, an attack is very probable.

In the tropics it is usual for persons to suffer on first arrival. This is due either to eating too much, to unsuitable food, or to the food being richer in bacterial life than they are accustomed to. Among soldiers headache and even a slight temperature is often seen, due to a tendency to over-eating which characterizes them abroad.

The treatment is divided into two stages, that of the attack and that between the attacks. When the attack is well established there is little to be done but to keep the patient quiet. Vomiting, though very distressing, often cuts short the pain, and if it does not occur naturally an emetic might be given for this purpose, if the patient will consent. At the commencement calomel 3 grains, or blue pill given at once, may evacuate the bowels and cause the headache to pass off. Aspirin, phenacetin, &c., do very little good when the attack has reached its height, but are effectual if taken very early. In some cases, however, they seem only to postpone the attack, so that the purgative should not be neglected. For the prevention of the disease the circumstances which may be supposed to have given rise to it should be rectified. More regular exercise should be taken and constipation should be treated with the classic aloes pill :—

Aloes	1½ gr.
Extract belladonna	⅛ ,,
,, nucis vom.	¼ ,,

This should be taken nightly till regularity has been established, and then gradually left off. Purgatives which produce violent peristalsis should be avoided both on account of the constipating after-effects and also because the production of diarrhœa is never advisable in the tropics. Salines should usually be avoided for the reason given above.

In foreign stations the following has been found useful :—

℞ Sod. bicarb.	gr. xx
Tr. rhei	ʒi
Tr. zingiberis	♏viii
Sp. chloroformi	♏v
Aq. ad	℥i

Two tablespoonsful three times a day a quarter of an hour before meals. Diet should be strictly attended to. The brain workers, who in England are so liable to suffer from headache, are apt to select foods easily digested, which also leave little residue after digestion. This residue is, however, highly putrescible. To act properly the intestines require bulk in the residue, so that fruit, vegetables, &c., which are largely indigestible and which are also not very putrescible should be taken. In the tropics meat should not be eaten more than twice a day, the midday meal being vegetarian. Each sufferer should study his idiosyncrasies as regards food and drink and learn to avoid those which seem to tend to produce the disease.

A REPORT ON SIX CASES OF SYPHILIS TREATED BY SALVARSAN AT THE STATION HOSPITAL, NOWSHERA.

By Captain E. V. AYLEN.
Royal Army Medical Corps.

The following notes on six cases of syphilis, treated by salvarsan, may be of interest to the readers of the Corps Journal.

In each case the method of administration was the same, namely, by intramuscular injection of a neutral suspension of the drug into the muscles of the gluteal region. Each case received two injections, preceded by a hypodermic injection of morphia.

Five of the six cases were fresh untreated cases of syphilis, and the remaining one was a severe case of gummatous ulceration of the pharynx, tonsils, tongue and scalp, which previously had been treated with mercury, both by inunction and by intramuscular injections as well as by potassium iodide. In this case the patient, before treatment by salvarsan, was unable to speak above a whisper, and could only swallow fluids with great difficulty. Three days after the first injection he could speak quite well and could swallow minced foods without difficulty. The five fresh cases were all undoubted and well marked cases of syphilis; in three of them the presence of the *Spirochæta pallida* was demonstrated before the injections were given.

I was unable to have Wassermann's test carried out before the injections, but subsequently, owing to the kindness of Lieutenant-Colonel Sir D. Semple, I have had it performed in four cases at the Central Research Institute, Kasauli. Arrangements have now been made to supply the divisional laboratory with a suitable centrifuge, I shall therefore be able to carry out Wassermann's test myself in future cases.

Of the twelve injections given only one was followed by pain of any severity, and only one by any rise of temperature.

In the case where pain occurred after the injection, I am of opinion that it was caused by the injection not being made deeply enough. A certain amount of induration also followed, but disappeared after a few days rest in bed, as did also the pain. In the case where pyrexia occurred, the rise of temperature was very slight and subsided after two days. In all six cases active signs of disease disappeared extremely rapidly after the first injection, and so far there have been no recurrences. In the cases where *S. pallida* were found previous to injection I was unable to find any parasites two days after the first injection.

In administering intra-muscular injections I think that unpleasant after-effects may be reduced to a minimum by attention to the following points: (*a*) The suspension of the drug should be quite neutral, as acid or alkaline injections are more liable to cause pain afterwards. (*b*) In the preparation of the suspension care must be taken to get the powder in as fine particles as possible. At least half an hour's careful grinding with a glass rod in a glass mortar is necessary. Large or gritty particles, besides being liable to block the needle of the syringe, are likely to cause pain afterwards. (*c*) The injection should be made as deeply as possible into the muscles of the upper part of the gluteal region. Superficial injections may cause subsequent necrosis of overlying skin and tissues. (*d*) A preliminary hypodermic injection of morphia is useful to prevent any subsequent local pain.

Three out of the four cases that have had Wassermann's test carried out at the Central Research Institute are still positive to the test, though it is of course too soon after the injections to expect a negative reaction.

In one case, however, that of Lance-Corporal C., in which spirochætes were found in the sore before injection, a negative Wassermann reaction was obtained nine weeks after the first injection and six weeks after the second. I am inclined to think that if Wassermann's reaction continues to be negative for six months after a patient has lost all signs of disease, the patient having had at least two injections of salvarsan, he may be considered cured, and his name removed from the syphilis register.

I should like to have the opinions of others on this very important point.

NOTES ON CASES.

Case 1.—Gunner P., 75th Battery, Royal Field Artillery, was placed on the Syphilis Register on June 27, 1910; he had been treated by mercurial inunction, two courses of injections of mercurial cream and one of calomel cream.

When admitted to hospital on March 30, 1911, he had a large gummatous ulcer of the right tonsil and a smaller one on the left. There was some ulceration of the posterior wall of the pharynx and considerable œdema of the fauces, so that he was only able to swallow liquids, and found great difficulty in articulation. There was some ulceration of the dorsum of the tongue and of the skin over the occipital region. He was very weak and debilitated.

April 4.—Salvarsan 0·4 grm. injected into the gluteal muscles.

April 5.—Temperature last night 101°; this morning 99·6°; very slight pain at the site of injection.

April 7.—There is a decided improvement in the condition of the pharynx, tonsils, and tongue, and he can speak and swallow much better. Temperature last night 100·6; this morning 98·2°.

April 13.—The ulcer on the left tonsil has nearly healed. All œdema disappeared four days after the injection. He can now eat solid food quite well. The gummatous ulcer on the scalp looks much better, and is beginning to heal. No swelling at the site of injection. Weight 9 st. 9 lb.

April 20—The ulcers on the tonsils and pharynx are quite healed.

The ulcer on the scalp is nearly healed. He feels much better and eats and sleeps well. Weight, 9st. 10lb.

April 23.—Injected salvarsan 0·4 grm., preceded by morph. hyd. ¼ gr.

April 24.—No bad after-effects followed the injection, either local or general.

April 27.—The ulcer on the scalp has quite healed, his throat is quite well. Weight 9 st. 13 lb.

May 11.—Discharged hospital to-day; to attend weekly. No signs of disease. Weight 10 st.

May 18.—Wassermann's reaction positive.

Case 2.—Gunner B., 75th Battery, Royal Field Artillery, admitted on March 11, 1911, with condylomata round the anus, a macular and roseolar rash on the back and loins with general adenitis. *Spirochæta pallida* demonstrated in a scraping from the condylomata.

March 17.—Injected salvarsan, 0·4 grm., preceded by morph. hyd. ¼ gr.

March 20.—No unpleasant after-effects, either local or general, followed the injection. No rise of temperature occurred. No spirochætæ could be found in the condylomata two days after the injection, and to-day, three days after the injection, the condylomata have practically disappeared. The rash has faded, leaving only a few dusky coloured macules on the skin of the lumbar region. Weight 11 st. 2 lb. No decrease since the injection.

April 5.—No signs of disease. Injected salvarsan, 0·2 grm., preceded by morph. hyd. ¼ gr. Weight 10 st. 12½ lb., a slight decrease.

April 11.—There was no rise of temperature after the last injection, and he complained only of slight local soreness. He was discharged hospital to-day to attend weekly. No signs of disease. Weight 10 st. 11 lb.

May 21.—Wassermann's reaction positive.

Case 3.—Lance-Corporal C., 1st Royal Munster Fusiliers, admitted to hospital on February 25, 1911, with some ulceration and œdema of the prepuce, the inguinal glands on both sides were enlarged, indurated and tender. A scraping from the sore showed *S. pallida.* After admission an extensive roseolar and macular eruption developed on the abdomen, chest, thighs, back and arms. There was some swelling and redness of the pharynx and tonsils, with enlargement of the cervical and submaxillary lymphatic glands.

March 17.—Injected salvarsan, 0·4 grm., preceded by morph. hyd. ¼ gr.

March 20.—No rise of temperature or unpleasant after-effects, either local or general, followed the injection. The sore has quite healed, and no spirochætæ could be found in the sore the day after the injection. The rash has nearly disappeared; he has no pain and feels quite fit. Weight, 9 st. 9 lb., a loss of 3 lb. since the injection.

March 27.—The rash has completely disappeared, the glandular enlargement is much smaller. Weight, 9 st. 11 lb.

April 5.—Injected salvarsan, 0·2 grm., preceded by morph. hyd. ¼ gr. Weight, 9 st. 12 lb. No symptoms.

April 7.—No unpleasant after-effects followed the injection. No rise of temperature occurred. Weight, 10 st.

April 11.—Discharged hospital to-day to attend. No signs of disease. Weight, 10 st. 1 lb.

May 20.—Wassermann's reaction negative. Patient has been attending hospital weekly since his discharge, he has no signs of disease. Weight, 10 st. 4 lb.

Case 4.—Private W., 2nd Battalion, Royal West Kent Regiment. This patient was sent to me from Peshawar for treatment by salvarsan. On admission on April 5, 1911, he had an indurated sore at the junction of the glands and prepuce, with an excavated floor, and marked enlargement and induration of both sets of inguinal and cervical glands. He also had a roseolous eruption on the abdomen, thighs and chest, some congestion of the pharynx, his hair was coming out, and he appeared very anæmic and debilitated. A scraping from the sore and some fluid from a blister failed to show the *S. pallida*, probably due in the case of the sore to the fact that it had been treated locally with lotio nigra in Peshawar.

April 7.—Injected salvarsan, 0·5 grm., preceded by morph. hyd. ¼ gr.

April 13.—He complained of slight local pain and soreness after the injection, which entirely passed off after three days, and was never bad enough to disturb his rest. No rise of temperature followed the injection. He has now improved greatly in every way except as regards body weight, which shows a decrease of 2 lb. The sore on the penis, which was formerly a deep crateriform ulcer, with an unhealthy base and hard everted edges, has nearly healed up. The rash has practically disappeared, only a faint mottling remaining; the glandular enlargement is very much less. Weight, 9 st. 5 lb.

April 20.—The sore on the penis has quite healed, and the rash has disappeared. He feels quite fit. Weight, 9 st. 7 lb.

April 23.—Injected salvarsan, 0·4 grm, preceded by morph. hyd. ¼ gr.

April 27.—No rise of temperature or unpleasant after-effects, either local or general, followed the injection. No signs of disease. Weight, 10 st.

May 6.—He was to-day sent back to Peshawar for duty. No signs of disease, and he feels quite fit. Wassermann's reaction positive. Weight, 10 st. 3 lb., a gain of 7 lb. since admission.

Case 5.—Gunner B., 86th Heavy Battery, Royal Garrison Artillery, was sent in from practice camp on February 25, 1911, with a sore on the penis. On admission he had a large sloughy sore on the glans penis with an indurated edge. A fortnight after admission he developed an extensive roseolous macular eruption on the thighs, scrotum and buttocks, with mucous patches on the buccal mucous membrane. The inguinal glands were enlarged and indurated. Weight, 10 st. 7 lb.

April 7.—Injected salvarsan, 0·5 grm., preceded by morph. hyd. ¼ gr.

April 13.—No rise of temperature followed the injection, and he complained only of slight local pain. To-day, six days after the injection, the sore on the penis has almost entirely disappeared; the rash is very faint, and the sores on the buccal mucous membrane have disappeared. Weight, 10 st. 5 lb.

April 20.—The only signs left now are faint discolorations, the remains of the rash on the buttocks and scrotum. He feels quite fit. Weight, 10 st. 5 lb.

April 23.—Injected salvarsan, 0·4 grm., preceded by morph. hyd. ¼ gr.

April 24.—No unpleasant after-effects, either local or general, followed the injection. No signs of disease.

April 27.—Patient discharged hospital to-day to rejoin his unit in Peshawar. No signs of disease. He feels quite fit. Weight, 10 st. 10 lb.

Case 6.—Private H., 1st Battalion, Royal Munster Fusiliers. This patient was admitted on April 10, 1911, with condylomata round the anus, a roseolous and macular eruption on the abdomen. He gave a history of a sore on the penis and a sore throat previous to admission. Scrapings from the condylomata showed *S. pallida* in large numbers. Weight, 9 st. 5 lb.

April 23.—Injected salvarsan, 0·4 grm., preceded by morph. hyd. ¼ gr.

April 24.—Slight local pain occurred a few hours after the injection. No rise of temperature.

April 27.—The condylomata have almost entirely disappeared, the rash has quite gone. No spirochætes could be found in the sores two days after the injection. Weight, 9 st. 9 lb.

May 3.—A painful indurated lump has appeared at the site of injection, the patient being kept in bed; he complains of nothing except slight pain at the site of inoculation.

May 8.—The lump is smaller and not so painful. The condylomata have entirely disappeared, and he feels quite fit. Weight 9 st. 8 lb.

May 11.—The lump has entirely disappeared, he has no signs of disease. Weight, 9 st. 9 lb.

May 17.—Injected salvarsan, 0·5 grm., preceded by morph. hyd. ¼ gr.

May 25.—No bad after-effects, either local or general, followed the second injection.

May 27.—Patient was discharged hospital to-day, to attend weekly. No signs of disease. Weight, 9 st. 9 lb.

Travel.

ACROSS NORWAY.

By Colonel J. M. BEAMISH.

Retired Pay, late Royal Army Medical Corps.

London to Hull.—A sultry day with broiling sun attended our start from London at 2 p.m., August 5, 1911, by the Great Northern Railway (King's Cross), in a well-appointed special train bound for Hull. We were soon however, to find relief from weather discomforts in a cooler journey through the Fen country, at Peterborough a clouded sky with some rain further on at Grantham, and a dull, albeit bearable, atmosphere at Hull, where we took ship in the "Eskimo" (Wilson Line, 3,000 tons), for Christiania, about 7.30 p.m.

Outward Voyage.—We were soon well away through the tidal estuary, past Spurn lighthouse to the open sea, and, having dined comfortably, experienced our first consolation of a stroll on deck. This was prolonged for most of us up to a late hour ; yet the dim twilight could not conceal the fact that we were a numerous party (upwards of 100 first-class passengers), seeking to recuperate flagging energies in the bracing air of Scandinavia.

North Sea.—Sunday, August 6. A perfect night and sound sleep enabled us to awaken betimes, and take advantage once again of early impressions on deck. These were mostly of an agreeable kind: a placid sea, a goodly number of passengers without overcrowding, and a well-found ship, launched in 1910. The company comprised such wandering units as a Cambridge professor, an American architect, Anglican and Roman Catholic clergymen, a British general, an Australian cadet, on duty at the Coronation, besides several Norwegians returning homeward.

A leaden sky afforded grateful protection from the August sun during the forenoon, while later in the day the balmy air permeating the blue northern sky flecked with light and passing clouds, and stirred by a moderate breeze, induced that repose sought for by a majority of the passengers, tempered with regret that such a dreamy existence must soon come to an end with the close of day.

Night came, dinner was over, and again the brilliant stars peered forth on a stream of passengers moving deckwards, to have a last look at the horizon, and discern the lights of Christiansand.

This town, on an ancient site, and once the seat of a bishopric, is approached through a series of more or less barren islands, and a land-locked fortified harbour of moderate dimensions, which was entered about 10 p.m. During a stay in port of a couple of hours, opportunity was taken of a walk on shore and visit to the town, which has a population of 15,000 and a handsome Gothic Cathedral in a central position; it was built in stone after destruction by fire of the former wooden town less than twenty years ago. It is well lit by electricity, is a port of call for imported necessaries, among them flour, and has a small lumber trade.

Christiania Fjord.—Monday, August 7: 7 a.m. finds us well within the estuary of Christiania Fjord, steaming slowly in fine weather, in view of wooded hills on either side. Horton, where there are technical schools and a naval yard, is seen on the left (west) bank of the fjord, which varies in width from five to three miles up to this point. Dobruk, a small seaside resort on the east bank, is passed about an hour from Christiania, and, the fjord narrowing gradually to half a mile, the port is reached at 10 a.m.

Landing at Christiania: Sights.—The "Eskimo" landed her passengers punctually to time soon afterwards, and opportunity was afforded to see some of the sights during the greater part of the day, so far as bookings ahead permitted.

Viking Ships.—The two viking ships housed in streets adjacent to the Grand Hotel, where many of the passengers put up, were first inspected. They are curious and interesting specimens of ancient naval architecture, measuring 20 m. by 5 m., furnished at bow and stern with projections in carved wood, much of which has disappeared. They are shallow to a cursory view, and were propelled by relatively short paddle-shaped oars, protruded through apertures immediately below the gunwale. Two ladders, for landing troops apparently, are preserved in very good condition: they are light planks about 20 ft. long, to which battens are affixed for easy progression, after the manner of similar contrivances in our own times.

Holmenkollen.—Less than half an hour having disposed of these interesting objects, the heights of Holmenkollen—an extensive suburb and scene of winter sports—north-west of the city, dotted with châlets and villas on the slopes, were gained by means of the electric tramcar and railway, commanding very fine views of the fjord southward during the ascent. About an hour and a half sufficed for this.

Harbour: Bygdo.—After a late lunch, the pleasure boats were utilized for a trip round the harbour, touching at the island, really Bygdo peninsula, which is occupied largely with cafés, some private houses, and forms a pleasant resort for the citizens during the summer months; the National Museum is housed here, and in the same grounds is the Goldskirke, a wooden structure dating from the twelfth century, which is well preserved, but was not available for close inspection at an advanced hour of the day.

Night Recreation.—During the preceding excursions the day was hot in the low-lying districts, but at its close, a change came over the scene, and the Scandinavian night made life indeed worth living in its exhilarating atmosphere, evidenced by the activity displayed in outdoor recreations. Tramcars were busy, the cafés were thronged, the boulevards on the approach to the Royal Palace crowded with both sexes *en grande tenue* up to a late hour, drinking in the intoxicating air. Oh! for such nights again.

Royal Palace.—The Royal Palace, it may be here observed, standing on an eminence a little westward of the town, is of noble proportions, and severe in the simplicity of its architecture, but is hemmed in by a public park and streets in a manner unworthy of its dignity.

Ethnology.—A word as to the general appearance of the people in these congregations. One is struck by their marked likeness to their Western (English) neighbours, in complexion and figure, with a generally fairer tinge of hair, and more pronounced bluish eyes. But no one could see them as a whole, even labourers and tradesmen returning from work, without recognizing that they are our kith and kin. The Viking blood has undoubtedly set its mark on the population of our islands, and in Norwegians, next to modern New Zealanders, I see the most typical congeners of the British race. In resemblance to the Anglo-Saxon family, I place them before Australians and Americans, both of whom are undergoing variations, due doubtless to admixture of foreign blood in the United States especially, and in the case of Australia to climatic adaptation.

Christiania (population 235,000), founded by Christian IV in 1624, is essentially a modern city, comprising well-built houses in regular streets. Its situation at the head of its fjord gives it a distinction absent from other European capitals. In the latitude of the Shetland Isles (60° N.), its winters are more open than in other parts of Norway, while the expanse of water southward tempers the cold of winter, which is further reduced by the protection afforded by high mountains on the north and east.

Overland Journey by Rail.—Tuesday, August 8, Christiania to Fagœrnes. This, the first stage of the overland journey, is completed by the Northern State Railway as far as Eina, and thence by the Valders Railway—total distance 121 miles, in seven and a half hours, including a half-hour for lunch. There is a gradual ascent from the fjord, which is visible for some distance north of Christiania. Nothing very remarkable is seen for an hour or two, beyond the usual pine-clad slopes, with intervening tarns or larger lakes and hamlets surrounded by patches of land by no means fertile, and chiefly devoted to pasture. Later on peeps of the Rands fjord are visible south-west, and a more fertile region entered upon, with better houses and cultivation, chiefly oats and potatoes, till Dokka is reached, whence, after lunch, the scenery is on a much grander scale, along a deep valley drained by a river of considerable size, with smooth reaches of shining water and gravelly bed, skirting the railway. The farmsteads here on the north side of the railway, the river intervening, are also more pretentious, and the buildings generally resemble those of Switzerland. Tunnels are frequently entered to debouch on a similar panorama not unlike much of the journey through the Vorarleberg between the Tyrol and Switzerland. Finally Fagœrnes, the terminus of the Valders railway, is reached about 4.30 p.m., and the night passed at the local hotel.

The station is surrounded by some fine scenery, a large lake, part of the Slœrifjord, broken by a peninsula, and surrounded by pine-clad hills of considerable height. There are boating and bathing as well as opportunities for pedestrianism, and, I was informed, ski-ing (pronounced shee-ing) in the winter. In addition to the ubiquitous pine, birch and mountain ash are everywhere visible.

By Stolkjœrres to Grindaheim. — Wednesday, August, 9. Fagœrnes to Grindaheim, 33 miles. The onward journey was continued at 9.30 a.m., in three stolkjærres adapted for six passengers—two in each—proceeding by the same route, and this distribution was repeated in the two succeeding stages, with the same carts, ponies and drivers as far as Lœrdalsören at the head of its fjord—a branch of the Sogne fjord westward. The route lay through similar scenery to that of the previous day, along the north shore of the Slœri fjord, whose numerous contractions and expansions resemble a series of lakes. Lunch was taken at the Valders Hotel, Oïlo, where the novelty of reindeer steak and also salmon trout were supplied. For six or eight miles beyond this halt the road lay along the south shore of the Strande fjord, where the character of the flora changes from pine to trees of smaller growth, such as birch and hazel, flanked by a comparatively bare but lofty mountain (5,000 ft.), at a distance, till Grindaheim was reached, and a halt made for the night about 6 p.m. It is situated on the Vangs fjord, in a theatre surrounded by bare hills, broken and interrupted by intervening passes and saddles. These rise to a height of 3,000 ft., and are reflected in a lake-like expansion of the fjord, forming a panorama of exquisite beauty.

Nystuen.—Thursday, August 10. Grindaheim to Nystuen with diversion to Lake Tyin, 28 miles. The drive was continued at 8 a.m. to the end of the fjord by a winding road, making a somewhat steep ascent of some miles towards the summit of a pass, near which a diversion was made to Lake Tyin (3,500 ft.), whence a fine view is obtained of the snowfields and higher mountains northward. Hills of bare and savage grandeur flank the route, which is again resumed and continued over the summit of the pass to Nystuen, which was made a halting-ground for the night about 6 p.m. Stuganosi, a grim mountain with shattered face of bare granite—site of a great avalanche—parallel to the main road and a lake, and towering up to 5,000 ft., is passed about a mile before entering the station from the east.

Lœrdalsören.—Friday, August 11.—Nystuen to Lœrdalsören, 43 miles. This drive completes the overland journey across Norway by rail and road as far as the Sogne fjord. The route lies at first through a somewhat tame country at the water-parting (3,295 ft.), and soon passes the Diocesan boundary between Christiania and Bergen, which is marked on the roadside; again, however, to descend between pine slopes, across a hill overlooking an unfinished road on the level route, to arrive at Maristuen—site of an hotel and old hospice—and thence some miles through Hœg to Husum, where lunch was taken, near which is a gorge, Svartegjel, of surpassing beauty, surrounded by giant mountains for several miles. Similar views of only inferior grandeur are seen as far as Blaaflaten, whence the road traverses a more open valley and good, even intense, cultivation as far as Lœrdalsören, where a halt was made for the night. At Borgund, on this route, there is a remarkable church, Stavkirke, of very ancient date—eleventh century—now disused and replaced by a modern building close by, but accessible to visitors. It is built of wood and of small dimensions in the pagoda style, with the usual Lutheran interior and an older (fractured) stoup.

Balholmen.—Saturday, August 12. Lœrdalsören to Balholmen (Sogne fjord). The steamer is boarded at 7 a.m., and a course taken at first to Gudvangen to land and take in passengers, and thence direct to Balholmen, which was reached about 3 p.m. The eastern limb of the Sogne fjord is of course tidal, but narrow and flanked by precipitous cliffs with numerous waterfalls, widening towards central parts of the fjord, with similar, often sheer cliffs, having scanty vegetation and a generally desolate appearance. Later on, in the still widening gulf, pines reappear in fair abundance on the hills, and hamlets of red brick present a marked feature in the landscape. The farmsteads are well cultivated with rye and green crops till Balholmen is reached. Here a halt was made over Sunday, August 13. Balholmen is finely situated on a spacious bay with deep water, in one part 4,000 ft. below mountains rising 4,000 ft. above sea-level, or a total of 8,000 ft. sheer height, and commands the principal divisions of the Sogne fjord ; the largest towards the sea westward and lesser ones, the Fjœrland northward, and the eastern division with its branches to Gudvangen and Lœrdalsören above referred to. The views are most pleasing around the shore-line, and the circular, disjointed hills often presenting the contour of mounds, several of them flecked with snow, even in August, complete a superb landscape. There is a new wooden English church of convenient size in the native style. Boating and bathing are of course obtainable, but sailing was infrequent or entirely absent—possibly dangerous in such a situation. The days were hot, reaching 80° F.; the nights, as elsewhere, balmy, admitting of sleep with open windows. The road walks are specially commendable, and extend for a mile or more upwards in two directions, before the country roads or paths are reached. It is altogether a striking settlement, and well worth a more prolonged stay.

To Mundal.—Monday and Tuesday, August 14, 15. Mundal on the Fjœrland fjord, 12 miles directly north of Balholmen, was reached about 1.30 p.m., after two hours' steam up the inlet. It is pleasantly situated at the head of the fjord and is chiefly interesting from its proximity to the Böjum and Suphellebrœ glaciers, which are severally approached by a two hours' drive each way from Mundal. The drive lies between mountains 5,000-6,000 ft. high, and the views are superlatively grand, showing numerous snowfields, and the superb Suphellebrœ glacier, divided at its centre by an islet of rock, causing by means of icy fragments from the upper position a secondary glacier (glacier remanié of Swiss writers) at the base. The Justedals snowfield immediately north of this glacier, representing 400 square miles, is the largest in Europe, and is comparable to, and coterminous with, the Jotunheim snowfield, but little inferior to it in size, eastward. The night was spent at Mundal after visiting the glaciers, and the steamer returned to Balholmen on the afternoon of the 15th.

Stalheim.—Wednesday, August 16. Balholmen to Stalheim. Balholmen was left, and the steamer retraced our former course as far as Gudvangen, whose fjord is remarkable for a rugged grandeur of the rocks, reaching precipitous heights as its end is approached. Stolkjærres await our arrival, and the famous Nœrodal Gorge is entered at once. The road rises gradually between bare steep rocks through the mouth of the gorge, traversed by a rapid river, narrowing and twisting as it ascends during a two hours' drive, mostly on the right bank, whence the Jordalsnut (3,620 ft.) comes into view, till Stalheimsklev is reached after a steep ascent on foot for more than a mile from the halting ground of the conveyances at the base. The hotel stands on a small plateau on the mountain side, commanding splendid views of the valley, north-east, towards Gudvangen, and also in the opposite direction. In the gorge numerous patches of disintegrated rock (grey syenite) mark the track of the watercourses, forming alluvium (scand. *ur*) at its river margins, and giving a singularly weird and weathered appearance to the naked gorge—6½ miles in length. The mountains on either side rise to 4,000-5,000 ft., and the tracks of vast avalanches are visible.

Bergen, Rail from Vossvangen.—Thursday, August 17. Stalheim to Bergen, via rail from Vossvangen. The drive, fifth in succession, is continued at 9.30 a.m. from Stalheimsklev at the summit of the Nœrodal by a gradual descent for two miles to the water-parting, between the Bolstad and Nœrodal fjords, near Opheim lake. The surrounding country is bleak and barren, and the mountains are covered with white patches, resembling snow, due to felspar. The road skirts the north side of the lake, soon to enter a valley at its western extremity, where the scenery completely changes from wild grandeur to a pleasing valley traversed by a rapid stream, its margin fringed on the south side by close birch forest, in proximity to dark pines which scale the heights. Near Tvinde a fine waterfall—the Tvindefos—is visible at close range. The valley widens at the Vangsvand (meadow lake) fjord, where there is extensive cultivation with residences of a superior class, which continues to Vossvangen —22½ English miles from Stalheim—where the railway is reached.

Sor Fjord.—The Sor fjord, which is tidal, is soon gained, and the railway skirts its south shore amidst grand scenery, bare bluffs arising successively out of the still water. Along the fjord and even higher up, sandstone appears to be the principal constituent of the rocks. In the interior eruptive rocks are more in evidence —granite chiefly, but also gneiss, felspar, syenite, &c.—all much weathered from the action of rain and frost.

The railway next quits the fjord for some miles through a barren region, till it is again met some miles from Bergen, when the country begins to wear a suburban aspect, and Bergen is finally reached at 7·30 p.m., four hours from Vossvangen.

Waterfalls.—Waterfalls, such a leading feature of Norwegian scenery, were of course everywhere visible along the fjords, but, though imposing from their altitude—in many places measuring an unbroken air-space of hundreds of feet—were greatly shrunken, owing to prolonged drought, and had lost much of the sublime effects attendant on a great volume of water. Among the most striking is the Kilefos, on the Næro-fjord, near Gudvangen, which descends from a height of 2,000 ft., the upper portion broken into spray after a perpendicular fall through 500 ft.

Bergen.—Tuesday, August 18—Bergen is well known from its historic and commercial importance as the second city of Norway. It is girt by mountains enclosing its harbour, and the irregularity of some streets in its north-east quarter, as well as the appearance of the older buildings, attest its antiquity. Southward, outside the older narrow streets are seen at least two fine broadways—one the Torve Gade—running north and south through the whole town, with handsome shops, and traversed by a central electric tramway. There are also good quays, and other open spaces, squares and gardens.

The fish-market is a peculiar feature of Bergen. Here fishing boats congregate on Saturday, market day, drawn up in line, bows inwards, along the quay, and laden with enormous stores of fish of various species—cod, whiting, mackerel, red mullet, &c.—which are eagerly sought after and purchased direct from the boatmen. The fish are first transferred to a series of saltwater tanks, from which they are fished out alive by a small hand net, the whole procedure open to inspection by the bystanders. It is a unique spectacle, and should not be missed by the visitor.

The Cathedral—Dom Kirke—dating from the eleventh century and another church—Kors Kirke—of post-Reformation date (1701), both Lutheran, are remarkable for fine interiors with handsome pulpits and seats, and the older church for a graceful east (chancel) window in the pointed style, containing some good coloured glass, and also for a grim Norman tower, loopholed, and massive in construction. Both churches stand not far apart on a rising slope under the hill overlooking the north-east and oldest quarter of the town. There are also two old cemeteries in the same nieghbourhood.

A visit to the Hanseatic Museum proved interesting. It is situated at a corner north-west of the fish-market overlooking the harbour. The compartments in which the relics lie are apparently in their original state, and exhibit their uses as part of a commercial house. Large ledgers are shown with dates going back to the late seventeenth century, in neat handwriting, and one is complete for nearly the whole of the eighteenth; towards the end of which the entries cease. There are various domestic implements, some swords and rapiers, and in special rooms cubicles resembling bunks on board ship, arranged in linear fashion, completely closed with sliding doors. The rooms are low, as was usual at the period, with large cross-beams supporting the wooden ceiling. A series of pulleys, still kept in working order, though not used, are seen in a long passage on an upper floor overhanging a narrow open entry immediately below. The Hanseatic League, as is well known, flourished in northern Europe—Hamburg, Lübeck, and elsewhere—during, and after, the Middle Ages. Commanding a fleet and army, they played a part similar to that of the Doges in Venice about the same period.

A three hours' drive, sixth and last, to Fantoft, three miles south-east and back, revealed the picturesqueness of the suburbs, surrounded as they are by a zone of hills, while the town is seen nestling between two inlets, or fjords, the larger Pudde fjord, the smaller the Vaagen, on which Bergen is situated, opening north-west to the sea.

The old Stavkirke, a pagoda-like wooden structure dating from the mediæval period, is shown to visitors at Fantoft: it was removed from its original site at Fortun on the Sogne fjord some years ago, and is now re-erected in a private park. Handsome villas crown all the smaller heights round the city and some way into the interior, and also occupy commanding positions on the hill which overlooks the bay. A cloudless blue sky completes the setting of the picture.

Town life in Bergen, *mutatis mutandis*, closely resembles that of Christiania.

Leper Hospital.—Bergen has a leper hospital doing useful work under local, aided by foreign, management, but want of time and the distance from the central parts of the city did not admit of a special visit to the institution.

Bergen under various Rules. Historical Sketch.—Bergen, founded in 1070, by Olaf Kyrre, King of Norway, derives its name from Björgvin, signifying "a pasture among the mountains." It has frequently been a scene of conflict during the centuries, through disputes regarding succession to the Crown in the earlier periods, monopoly of the fishing industry by the Hanseatic League in the fifteenth century, under trade concessions by Denmark, with which Norway was united for 400 years; and later, in 1665, as the battle-ground between the English and Dutch, in which, with the co-operation of local forces, the English fleet, under Admiral Tiddyman, withdrew with a loss of 600 killed. Under Danish supremacy, from the seventeenth to the nineteenth century, Bergen was the most prosperous and populous town of Norway, and so continued up to the union with Sweden in 1814, when Christiania took its place as the Capital.

Vicissitudes of Scandinavia.—Norway was comprised in the ancient dominion of Scandinavia, Sweden, Norway, and a great part of Denmark—whence proceeded the Northmen or Normans who conquered Normandy about 900 A.D., and eventually England (1066). They are also called sea kings or vikings. Norway was conquered by Canute the Great (1028), and by the Union of Calmar (1389), Denmark, Norway and Sweden were made one kingdom under Queen Margaret. On the deposition of Christian II the independence of Sweden under Gustavus Vasa was acknowledged (1523). At the peace ending the turmoil of the Napoleonic wars in 1814, Norway was given to Sweden by the treaty of Kiel, gained its independence again in the same year, but was finally declared a "free, independent, indivisible, and inalienable" State united to Sweden (November 4, 1814). This union lasted till recent years, when Norway, as is well known, attained complete independence under the kingship of Haakon VII, second son of the present reigning King of Denmark.

Population of the Interior, etc.—The peasants, all landowners, are almost entirely engaged on their farms (gaards), generally the whole family at the same time, averaging four or five, children of tender age included. The people of full age are sturdy in appearance, trustworthy, and honest in character, and always obliging. They are simple in their habits and reserved in manner, not, however, without a fund of humour on occasions. As in Switzerland, hay-cropping is a chief occupation, and they have a peculiar way of saving the crop by means of standing hurdles, about 5 ft. high, on which the hay is exposed to the sun, whereby there must be some saving of labour. Stooks of corn are also reared with the ear stalks exposed in a similar way. Cattle, even near poor dwellings at high elevation, are sleek and well fed.

Their houses are of course mostly built of wood, but always with a substantial stone basement, raised to a height sufficient, if required, for the lodgment of cattle underneath. There are, however, usually large out-offices attached to all the more pretentious holdings, and special hay-sheds are constructed, with a sloping approach from the exterior of the building to an upper story, whence the hay is dropped into stalls on either side of the floor for consumption of the cattle housed in the basement.

The houses in the more prosperous districts are roomy and well lit by glazed windows which appear in the gable as well as other aspects, thus ensuring good ventilation and light in the winter months. On the high passes, however, the houses are much smaller, but well kept, and the inhabitants, equally with the cattle, are robust and well fed.

The roads are good, metalled with well-pounded stone, and of a width suited to the locality. Gates dividing the farms frequently bar the way, but are readily opened by children eager to let traffic through for a small gratuity.

The most usual vehicle is the stolkjærre, a light cart mounted on springs, with a narrow back seat (as in a hansom) for the driver, and two front seats, as in a buggy, underneath both of which light luggage may be conveyed. The ponies are excellent, and invariably well treated, urged on without minatory ejaculations, and moving readily at a peculiar almost noiseless chirp from the driver. Norway may fitly be described as the Nirvana of the brute creation.

The hotels are well found in every respect, sufficiently so even in remote localities. As in Switzerland the tourist appears to be the principal asset, and there is no reason why the industry should not be extended indefinitely.

The dress of the male population presents nothing distinctive at the present day, so far as could be seen. The female costume also mainly conforms to the general European fashions, but a relic of the picturesque old Norwegian female dress survives in a red embroidered vest, laced in front, commonly worn by waitresses at hotels, and in the square-shaped hat with gay trimmings, resembling those of the bygone recruiting serjeant, affected in addition by some of the general population.

Legislature.—A reference to the constitution and working of the Norwegian Parliament is curiously apposite at the present time. The Storthing (Parliament as a whole) is composed of an Upper House (lag-thing), comprising one-fourth of the elected members, the remaining three-fourths constituting the Lower House (odelsthing). Bills passed by both Houses require the Royal assent as a rule; but, if twice rejected by the Upper House, the whole Parliament meets, and two-thirds decide the motion. For legal sanction to resolutions thus carried the Royal assent is still required.

Geology.[1]—The Archæan formation, gneiss, schist, quartz, &c., predominates over extensive districts, overlaid by sparagmite—fragmentary rocks with felspar embedded—extending over a great part of Central Norway. The Silurian system, fossiliferous and greatly dislocated, succeeds, and is widely distributed between the Hardanger and Trondhjem fjords. This is superimposed by a sandstone formation with which the series of stratified rocks in South Norway terminates, the next fossil-bearing strata being diluvial (Pleistocene).

Climatic Features.—The mild climate of Norway is attributable to the high temperature of the water in the fjords derived from the Atlantic, aided by south-west winds which diffuse the superimposed heated air over the interior. Currents also round the south coast, directed northward, probably aid in this diffusion. Tides, almost absent at Lindesnœs, increase northwards along the principal ports to 8 or 9 ft. at Hammerfest and Vardö.

Language.—During the long connexion with Denmark since Reformation times, it was to be expected that the language of Norway should have assumed a Danish type, and in fact, many Norwegians were the principal writers in the Danish language. Since the beginning of the nineteenth century, however, there has been a more or less successful attempt to resuscitate a national literature, and enthusiasm has gone so far as to reconstruct, from the mother-tongue (old Norwegian) and modern Norwegian dialects, a composite language 'Landsmal' of which J. Aasen was the exponent. It is represented at present in a small literature, but is nowhere spoken. Dano-Norwegian, therefore, is still in common use, with a tendency to incorporate Norwegian provincial words, and deviate from Danish pronunciation in certain respects.

Return Voyage.—Saturday, August 19.—The R.M.S. "Oslo" Wilson Line, leaving Bergen for Hull, follows a course westward between a series of barren islands till the open sea is sighted in the space of two hours, during which she frequently nears the rocks, indicating deep water. Presently, she steers an oblique course south-west without entering the open sea, and here a number of fishermen's dwellings are seen from time to time, their boats anchored near boathouses in sheltered coves. Patches of rye, cultivation of limited extent, are invariably seen near the dwellings, but other means of subsistence would appear to be entirely derived from the fishing industry.

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[1] "Encyclopædia Britannica," Ninth Edition.

In the course of the steamer, high mountains, some covered with snow, are visible southward and eastward in the direction of the Hardanger fjord, the weather is superb, and the sea disturbed only by a ripple.

Hangesund.—Hangesund, 7 p.m.—Fjord more open—islands at a distance lying outside—stayed for over an hour for discharge and embarkation of cargo, cases of preserved fish.

Stavanger.—Stavanger, 10 p.m.—Went on shore after dark. The town, founded in the eleventh century and once the seat of a bishopric, stands on a peninsula between two bays and the principal streets follow the line of a central ridge (resembling Valetta, Malta) overlooking the bays; most of the streets are narrow and roughly paved with cobbles. It has now a large export trade, dating from 1874, in preserved fish, chiefly sardines and anchovies, and from small beginnings is rapidly growing in prosperity.

In the North Sea.—Sunday, August 20. A swell was perceptible during the night, but the day broke fine with a calm sea as the day advanced. Sailing over the Dogger Bank at 3.30 p.m. Difference of time one hour between the ports. News received by Marconigram at midday that the railway strike had ended in a settlement on Saturday night. Leaden sky with some rain in the afternoon—breeze freshening.

Passengers in s.s. "Oslo."—The first-class passengers in the "Oslo" numbered about 110, comprising several outgoing by the "Eskimo" a fortnight before, and many others, including a peer (absent from the voting), a baronet, a railway magnate, and a party of geologists, who were often encountered along the Norwegian routes. Anglers of varied capacities might be seen expounding secrets of the craft to spell-bound listeners. Nor was the haughty deer-slayer absent on the outward voyage, eagerly anticipating the advent of the season, undeterred by almost prohibitive rents on the shooting grounds.

Strike at Hull.—Less assuring news awaited us at 6.30 a.m.

next morning, 21st, at Hull, in that we could not move to our destinations from the Riverside Station direct, and, on the way by hansom to the Paragon (town) Station, the streets surrounding the wharves and warehouses adjoining were seen deserted.

Arrival in London.—The Great Northern Railway train was, however, found there in readiness, and the journey to London was pursued without interruption, within the usual time. A few soldiers were picketed on the North Eastern Section for some distance out of Hull, but no disturbance of the peace was visible. "All's well that ends well."

Farewell to Norway—Bergen, August 19, 1911.

The tocsin sounds, what time we quit the quay,
And soon we float securely in the bay,
The gabled roofs that line the parting shore
And chequered hill-sides shall be seen no more.
Farewell! old Norway, thy grey cliffs inspire
A secret longing—nay, a heart's desire,
To hear again the sound of splashing oars,
To greet once more thy hospitable shores,
To view the grandeur of thy snow-fields wide,
And flood and fjord in union side by side;
Some day returning, may we live to see
Thy realm secure, in growing prosperity.

Report.

AN EXPERIMENTAL MARCH TO INVESTIGATE THE AMOUNT OF FOOD REQUIRED BY MEN ON ACTIVE SERVICE.[1]

(*Continued from p.* 411.)

APPENDIX II.

Tables I and II show the weights "stripped" and "loaded" of the men of the Loyal North Lancashire, and also of the detachment, Royal Army Medical Corps, and the officers. The weights of the detachment, Army Service Corps, have not been included since these men rode, and cannot be fairly compared with the rest. The "stripped" weights include the weight of trousers, drawers and socks. In calculating the total dead weight carried, 3 lb. 5 oz. must be added to the difference between the "stripped" and "loaded" weights to correct for above.

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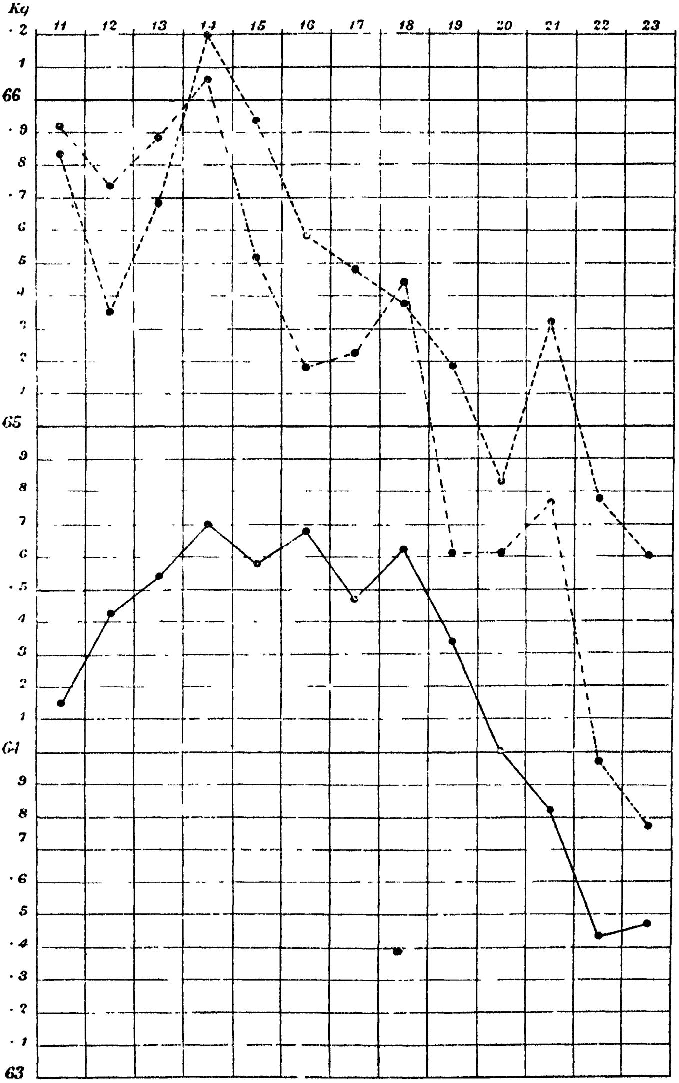
[1] Under the supervision of the Research Committee—Hygienic Section, Army Medical Advisory Board.

TABLE III.—Curves showing Variation in Average weight of—

Detachment, Loyal North Lancashire Regiment ——————
,, Royal Army Medical Corps .. - - - - - - - -
Officers (2 kg. deducted throughout) .. .. —.—.—.—



(This figure is taken from the weights of these articles given in Section 3 B, "Field Service Manual, 1908," Infantry Battalion, pp. 17 and 18).

In the curves on Table III the actual weights of the men of the Loyal North Lancashire and the Royal Army Medical Corps are given. In the case of the officers a deduction of 2 kg. has been made from the actual average weight to admit of the curves being brought together for comparison.

The measurements of which the variations are recorded in Tables V to VIII were taken as follows: In measuring the chest the tape was passed below the inferior angle of the scapulæ and above the nipples. The arms were allowed to hang loosely at the side, and a mean between inspiration and expiration taken. In the case of the abdomen the man was made to stand at attention, without drawing in the abdomen, and the tape kept horizontal, covering the navel. In measuring the calf the thickest part of the calf was selected.

TABLE IV.—SHOWING CONNECTION BETWEEN LOSS OF WEIGHT AND ORIGINAL WEIGHT AND AGE OF SOLDIERS.

Rank and name	Loss of weight per cent. of weight on October 11	Serial No. as regards total original weight	Serial No. as regards age
Private Dillon	− 3·74	9	19
Lance-Corporal Smith	− 2·80	3	13
Private Sullivan..	− 2·76	1	7
Colour-Serjeant Jeffreys ..	− 2·43	6	1
Private Broad	− 2·29	11	16
,, Killinger..	− 2·26	4	15
,, Sharples	− 1·99	2	4
,, Nokes	− 1·95	14	20
,, Walsh	− 1·89	12	2
,, Jones	− 1·83	7—69	8—105
,, Andie	− 1·80	10	9
,, Mostyn	− 1·15	16	13
,, Wilde	− ·82	15	14
,, Currie	− ·17	19	3
,, Harvey	− ·07	8	11
Lance-Corporal Cooke	+ ·45	5	5
Private Judge	+ ·92	18	10
,, Cooper	+ 1·15	16	18
,, Pushman	+ 1·38	13	16
,, Flynn	+ 4·88	20—140	6—105

The serial Nos., according to weight of first ten, when added together, amount to 69, of the last ten to 140. The serial Nos., according to age, are equally distributed in both classes.

TABLE V.—DETACHMENT, LOYAL NORTH LANCASHIRE REGIMENT.
Variations in Chest Measurements.—Inches.

Name	1st week	2nd week	Whole period	Remarks
Colour-Serjeant Jeffreys	− 1·375	− 1·00	− 2·375	
Lance-Corporal Cooke..	− ·375	− ·125	− ·50	
,, Smith	− ·875	+ ·375	− ·50	
Private Andie	− 1·875	+ ·375	− 1·50	
,, Broad	+ 3·125	− ·625	+ 2·50	
,, Cooper	− 2·75	+ 2·00	− ·75	
,, Currie	+ ·125	..	..	Not included in totals.
,, Dillon	− ·75	− ·375	− 1·125	
,, Flynn	±	− 1·00	− 1·00	
,, Harvey ..	±	− ·75	− ·75	
,, Jones	− 1·125	− ·375	− 1·50	
,, Judge	+ ·50	− ·125	+ ·375	
,, Killinger ..	+ ·25	− 2·25	− 2·00	
,, Mostyn ..	− ·75	− 2·00	− 2·75	
,, Nokes	+ ·25	− 1·625	− 1·375	
,, Pushman ..	− 1·00	±	− 1·00	
,, Sullivan ..	− 1·875	− ·375	− 2·25	
,, Sharples ..	+ ·25	− ·25	±	
,, Walsh	+ ·625	..	..	Not included in totals.
,, Wilde	− 1·75	+ ·5	− 1·25	
Totals	− 10·125	− 7·625	− 17·75	
Average ..	− ·56	− ·42	− ·98	
	11 lost. 7 gained. 2 no change.	13 lost. 4 gained. 1 no change. 2 not measured.	15 lost. 2 gained. 1 no change. 2 not measured.	

TABLE VI.—DETACHMENT, LOYAL NORTH LANCASHIRE REGIMENT.
Variations in Abdominal Girth—Inches.

Colour-Serjeant Jeffreys	− ·75	− 1·75	− 2·50	
Lance-Corporal Cooke	+ 1·125	− 1·00	+ ·125	
,, Smith	+ 1·00	− ·75	+ ·25	
Private Andie	− ·375	− ·875	− 1·25	
,, Broad	+ 2·375	− 2·50	− ·125	
,, Cooper ..	+ ·75	− 1·25	− ·50	
,, Currie ..	±	..	..	Not included in totals.
,, Dillon ..	+ ·875	− ·75	+ ·125	
,, Flynn ..	+ 1·25	− ·25	+ 1·00	
,, Harvey ..	+ ·25	− ·75	− ·50	
,, Jones	+ 1·75	− 2·50	− ·75	
,, Judge	+ ·625	− ·25	+ ·375	
,, Killinger ..	− ·50	− 1·00	− 1·50	
,, Mostyn ..	− ·50	+ ·50	±	
,, Nokes	− ·50	− 1·25	− 1·75	
,, Pushman ..	+ 1·25	− ·25	+ 1·00	
,, Sullivan ..	− ·50	− 1 00	− 1·50	
,, Sharples ..	+ 2·25	− 1·50	+ ·75	
,, Walsh ..	+ ·375	..	..	Not included in totals.
,, Wilde	− ·625	− 1·125	− 1·75	
Totals ..	+ 9·75	− 18·25	− 8·50	
Average ..	+ ·54	− 1·01	− ·47	
	7 lost. 12 gained. 1 no change.	17 lost. 1 gained. 2 not measured.	10 lost. 7 gained. 1 no change. 2 not measured.	

TABLE VII.—DETACHMENT, LOYAL NORTH LANCASHIRE REGIMENT.

Variations in Calf Measurements.—Inches.

Name	1st week	2nd week	Whole period	Remarks
Colour-Serjeant Jeffreys	+ ·25	− ·625	− ·375	
Lance-Corporal Cooke..	+ ·375	+ ·125	+ ·50	
,, Smith..	±	±	±	
Private Andie	±	− ·125	− ·125	
,, Broad	±	±	±	
,, Cooper	+ 1·00	− 1·00	±	
,, Currie	+ ·125	..	..	Not included in totals.
,, Dillon	+ ·375	− ·25	+ ·125	
,, Flynn	+ ·25	±	+ ·25	
,, Harvey ..	+ ·375	− ·375	±	
,, Jones	±	+ ·125	+ ·125	
,, Judge	+ ·375	+ ·50	+ ·875	
,, Killinger ..	+ ·25	±	+ ·25	
,, Mostyn ..	− ·125	+ ·125	±	
,, Nokes	− ·375	+ ·125	− ·25	
,, Pushman ..	+ 1·125	− ·75	+ ·375	
,, Sullivan ..	− ·25	− ·25	− ·50	
,, Sharples ..	+ ·50	− ·625	− ·125	
,, Walsh	+ ·375	..	..	Not included in totals.
,, Wilde	− ·125	+ ·125	±	
Totals	+ 4·00	− 2·975	+ 1·125	
Average ..	+ ·22	− ·16	+ ·06	
	12 gained. 4 lost. 4 no change	6 gained. 8 lost. 4 no change. 2 not measured.	7 gained. 5 lost. 6 no change. 2 not measured	

TABLE VIII.—ROYAL ARMY MEDICAL CORPS.

Variations in Measurements.

Name	1st week	2nd week	Whole period
	Chest.		
Corporal Dady	− 2·875	− 1·125	− 4·00
Private Boxall	− ·125	− ·50	− ·625
,, Durrant	− 1·375	− ·125	− 1·50
Total	− 4·375	− 1·75	− 6·125
Average	− 1·46	− ·58	− 2·04
	Abdomen.		
Corporal Dady	+ ·875	− ·50	+ ·375
Private Boxall	+ ·50	− ·25	+ ·25
,, Durrant	+ 1·50	±	+ 1·50
Total	+ 2·825	− ·75	+ 2·125
Average	+ ·958	− ·25	+ ·708
	Calf.		
Corporal Dady	+ ·125	±	+ ·125
Private Boxall	±	+ ·50	+ ·50
,, Durrant	+ ·25	− ·25	±
Total	+ ·375	+ ·25	+ ·625
Average	+ ·125	+ ·083	+ ·208

Appendix III.

Rations issued; their Composition and Value.

The rations issued were based on the scale laid down in Allowance Regulations (1907), para. 27. The food-stuffs provided varied somewhat and six tables have been constructed showing the articles issued on various days. These are as follows:—

	Calorie value.
No. 1.—Corned beef, biscuit, jam, grocery ration + potatoes	3311·66
No. 2.— ,, ,, ,, ,, + cauliflower ..	3228·26
No. 3.— ,, ,, ,, ,, + mixed vegetables..	3274·29
No. 4.—Fresh meat, bread, jam, grocery ration + potatoes	3464·84
No. 5.— ,, ,, ,, ,, + cauliflower ..	3381·44
No. 6.— ,, ,, ,, ,, + mixed vegetables..	3427·47

These figures represent the gross total value of the various rations, but it is not practical to suppose that this represents the value which the body is capable of getting out of them. It is necessary to make a certain deduction on account of defective absorption, which may actually vary considerably under varying conditions, but is placed by Tigerstedt (*Lehrbuch der Physiologie des Menschen*, Bd. 1, 1909, p. 176) at 10 per cent. Making the necessary deduction, we find the net value of these rations to be—

No. 1	2980·5 C.
No. 2	2905·43 C.
No. 3	2946·86 C.
No. 4	3118·36 C.
No. 5	3043·29 C.
No. 6	3084·72 C.

No. 1 was issued on October 13, 14, 15 and 16, No. 2 on the 11th, and No. 3 on the 12th; on the remaining days No. 4 was issued. Nos. 5 and 6, which were not actually issued, are given for purpose of comparison with Nos. 2 and 3. The composition of the corned beef, biscuit, jam, sugar and tea has been taken from analysis of samples of these articles actually issued during the experiment. The composition of the fresh meat, bread, potatoes and vegetables has been taken from Attwater's tables, "U.S. Department of Agriculture, Bulletin No. 28 (Revised Edition), 1899." The fresh meat was taken as "beef, fresh, sides, medium fat, as purchased" (p. 28), the calorie value per pound being 1,040; the bread as "white bread from baker's flour" (p. 61), the calorie value per pound being 1,145.

Potatoes have been taken as "potatoes, raw or fresh, as purchased" (p. 68), the calorie value per pound being 310.

The vegetables have been taken as "cauliflower, as purchased" (p. 66), calorie value per pound = 140; "onions, as purchased" (p. 67), calorie value per pound = 205; "parsnips, as purchased" (p. 67), calorie value per pound = 240; and "carrots, as purchased" (p. 65), calorie value per pound = 160. Mixed vegetables have been calculated as consisting of equal parts of carrots, parsnips and onions, these being the actual components of the ration as issued on October 12.

In addition to the above ration scales the following extras were added:—

On October 11 a packet of cheese sandwiches was issued to each man, in view of the fact that they would not receive any food until arrival in camp in the evening. This sandwich was consumed as a mid-day haversack ration. The composition and value of this sandwich have been ascertained by direct analysis: calorie value 783·59.

On the 16th a ration of 2¼ oz. of rum, and on the 20th one of 2½ oz. of whisky was issued for medical reasons. The calorie value of these has been estimated in the following manner:—The percentage strength of alcohol present has been taken as 44·18 in the case of rum, and 46 in the case of whisky, and 7 calories allowed per gramme of alcohol actually present in the ration issued. In the case of rum an addition has been made in respect of 0·5 per cent of sugar present in this spirit.

The terms "nominal" and "actual" are used to qualify the weight in columns 2 and 3 of the ration scale tables. The former signifies the gross weight of the ration as laid down in Allowance Regulations, the latter the net weight after the weight of any tin, paper, or other wrapping is deducted. The salt was weighed after drying. In some samples as much as 1·874 grm. of water were present in each packet of salt.

Table IX. consists of a diagrammatic representation of the daily content in proteids, fats and carbohydrates of the rations issued day by day, with the gross energy value of the same. The last column shows the average amounts over the twelve days.

ANALYSIS OF RATIONS.

	Weight in Grammes		Moisture	Protein, N × 6·25	Fat	Carbohydrates	Calories
	Nominal	Actual					
Ration Scale, No. I. Corned Beef, Biscuits, Potatoes, Jam and Grocery Ration.							
Corned beef, 1 lb. ..	453·60	336·00	183·28	100·59	42·50	..	807·67
Biscuits, 8	453·60	484·00	35·42	75·31	6·67	361·35	1853·34
Potatoes, ½ lb. ..	226·80	226·80	141·97	4·08	0·22	33·32	154·39
Strawberry jam, ¼ lb.	113·40	88·60	15·45	0·61	..	68·94	285·19
Sugar, 2 oz.	56·70	49·30	..	..	..	Cane sugar Invert sugar 46·83	192·00
Tea, ½ oz.	14·17	19·23	1·92	4·65	..	..	19·07
Salt (dry)*, ½ oz. ..	14·17	13·93	..	..	..	..	..
47 oz.							
Total	1332·44	1217·86	378·04	185·24	49·39	510·44	3311·66
Percentage of whole ration, actual weight.			31·04	15·21	4·05	41·91	271·92

* The salt sometimes contained 1·874 grammes of water.

	Weight in grammes		Moisture	Protein, N × 6·25	Fat	Carbo-hydrates	Calories
	Nominal	Actual					
Ration Scale, No. II. Corned Beef, Biscuits, Cauliflower, Jam and Grocery Ration.							
Corned beef, 1 lb. ..	453·60	336·00	183·28	100·59	42·50	..	807·67
Biscuits, 8	453·60	484·00	35·42	75·31	6·67	361·35	1853·34
Cauliflower, ½ lb. ..	226·80	226·80	209·24	4·08	1·13	10·65	70·99
Strawberry jam, ¼ lb.	113·40	88·60	15·45	0·61	..	68·94 Cane sugar Invert sugar	285·19
Sugar, 2 oz.	56·70	49·30	..	..	..	46·83	192·00
Salt (dry), ½ oz. ..	14·17	13·93	..	..	..	..	..
Tea, ½ oz. .. .. 47 oz.	14·17	19·23	1·92	4·65	..	..	19·07
Total	1332·44	1217·86	445·31	185·24	50·30	487·77	3228·26
Percentage of whole ration, actual weight.			36·56	15·21	4·30	40·05	265·07
Ration Scale, No. III. Corned Beef, Biscuits, Mixed Vegetables, Jam and Grocery Ration.							
Corned beef, 1 lb. ..	453·60	336·00	183·28	100·59	42·50	..	807·67
Biscuits, 8	453·60	480·00	35·42	75·31	6·67	361·35	1853·34
Mixed vegetables— Carrots } Parsnips } ½ lb. Onions }	226·80	226·80	194·45	2·17	0·90	24·33	117·02
Strawberry jam, ¼ lb.	113·40	88·60	15·45	0·61	..	68·94 Cane sugar Invert sugar	285·19
Sugar, 2 oz.	56·70	49·30	..	..	..	46·83	192·00
Tea, ½ oz.	14·17	19·23	1·92	4·65	..	..	19·07
Salt (dry), ½ oz. .. 47 oz.	14·17	13·93	..	..	..	..	..
Total	1332·44	1217·86	430·52	183·33	50·07	501·45	3247·29
Percentage of whole ration, actual weight.			35·35	15·50	4·11	41·91	268·85
Ration Scale, No. IV. Fresh Meat, Bread, Potatoes, Jam and Grocery Ration.							
Fresh meat (beef), sides, medium fat, 1¼ lb.	566·80	566·80	279·99	83·88	102·59	..	1297·99
Bread, 1¼ lb... ..	566·80	566·80	200·08	52·14	7·36	300·97	1516·20
Potatoes, ½ lb. ..	226·80	226·80	141·97	4·08	0·22	33·32	154·39
Jam, strawberry, ¼ lb.	113·40	88·60	15·45	0·61	..	68·94 Cane sugar Invert sugar	285·19
Sugar, 2 oz.	56·70	49·30	..	..	..	46·83	192·00
Tea, ½ oz.	14·17	19·23	1·92	4·65	..	..	19·07
Salt (dry), ½ oz. .. 55 oz.	14·17	13·93	..	..	..	..	..
Totals	1558·84	1531·46	639·41	145·36	110·17	450·06	3464·84
Percentage of whole ration, actual weight.			41·75	9·49	7·19	29·38	226·24

Ration Scale, No. V.

Fresh Meat, Bread, Cauliflower, Jam and Grocery Ration.

—	WEIGHT IN GRAMMES		Moisture	Protein, N × 6·25	Fat	Carbo-hydrates	Calories
	Nominal	Actual					
Fresh meat (beef) .. sides, medium fat, 1¼ lb.	566·80	566·80	279·99	83·88	102·59	..	1297·99
Bread, 1¼ lb. ..	566·80	566·80	200·08	52·14	7·36	300·97	1516·20
Cauliflower, ½ lb. ..	226·80	226·80	209·24	4·08	1·13	10·65	70·99
Jam, ¼ lb.	113·40	88·60	15·45	0·61	..	68·94 Cane sugar Invert sugar	285·19
Sugar, 2 oz.	56·70	49·30	..	..	..	46·83	192·00
Tea, ½ oz.	14·17	19·23	1·92	4·65	..	..	19·07
Salt (dry), ½ oz. .. 55 oz.	14·17	13·93	..	..	..	.	..
Total ..	1558·84	1531·46	706·68	145·36	111·08	427·39	3381·44
Percentage of whole ration, actual weight.			46·14	9·49	7·25	27·97	220·79

Ration Scale No. VI

Fresh Meat, Bread, Mixed Vegetables, Jam and Grocery Ration.

—	Nominal	Actual	Moisture	Protein, N × 6·25	Fat	Carbo-hydrates	Calories
Fresh meat (beef), sides, medium fat, 1¼ lb.	566·80	566·80	279·99	83·88	102·59	..	1297·99
Bread, 1¼ lb. ..	566·80	566·80	200·08	52·14	7·36	300·97	1516·20
Mixed vegetables— Carrots } Parsnips } ½ lb. Onions }	226·80	226·80	194·45	2·17	0·90	24·33	117·02
Jam, ¼ lb.	113·40	88·60	15·45	0·61	..	68·94 Cane sugar Invert sugar	285·19
Sugar, 2 oz.	56·70	49·30	..	..	..	46·83	192·00
Tea, ½ oz.	14·17	19·23	1·92	4·65	..	..	19·07
Salt (dry), ½ oz. .. 55 oz.	14·17	13·93	..	..	..	..	..
Total	1558·84	1531·46	691·89	143·45	110·85	441·07	3427·47
Percentage of whole ration, actual weight.			45·18	9·37	7·23	28·80	223·80

Issued October 11, 1909. "EXTRAS."

Bread and cheese ration	Moisture	Protein, N × 6·25	Fat	Carbo-hydrates	Calories
Percentage	32·55	17·93	30·19	17·01	424·02
Per ration .. .. .. (184·80 grammes)	60·15	33·13	55·79	31·43	783·59

The 2½ oz. of alcohol issued on October 16 and 20 contained calories as follows :—
2½ oz. of rum, containing 44·18 per cent of alcohol by volume = 220·6 calories.
2½ oz. of whisky, containing 46 per cent of alcohol by volume = 228·6 calories.

Royal Army Medical College,
November 12, 1909.

W. W. O. BEVERIDGE, *Major, R.A.M.C.*

APPENDIX IV.

Table X gives a statement of distances marched, and heights climbed on each day of the march, with estimate of total chemical energy liberated. The distances have been calculated, after careful measurement, with a wheel map measurer, of the marches as traced on the Ordnance map, 6 in. to the mile. The heights have been estimated from the bench marks and contours on the same maps, and, in the absence of these, from the balanced opinions of the various officers. This was done in the first place each day after the conclusion of the march, but the various measurements and calculations have been thoroughly checked since return to the College.

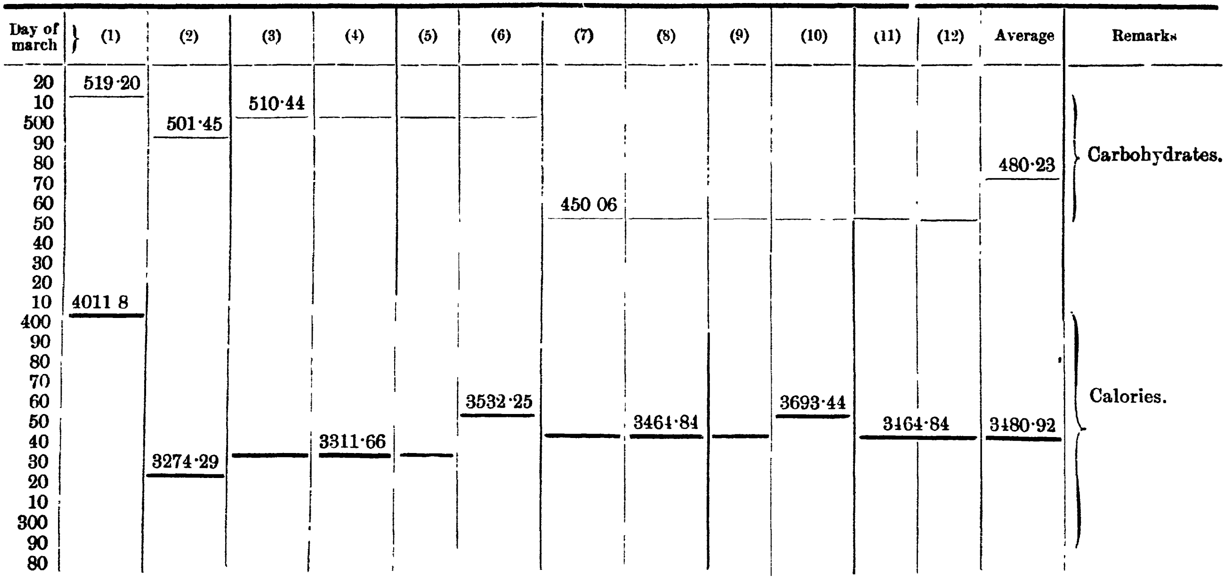
The work done is stated in terms of calories expended, the following calculation founded on Zuntz's work (quoted by Schumberg "Sanitätsdienst und Gesundheitspflege im deutschen Heere," 1909, p. 297) has been used.

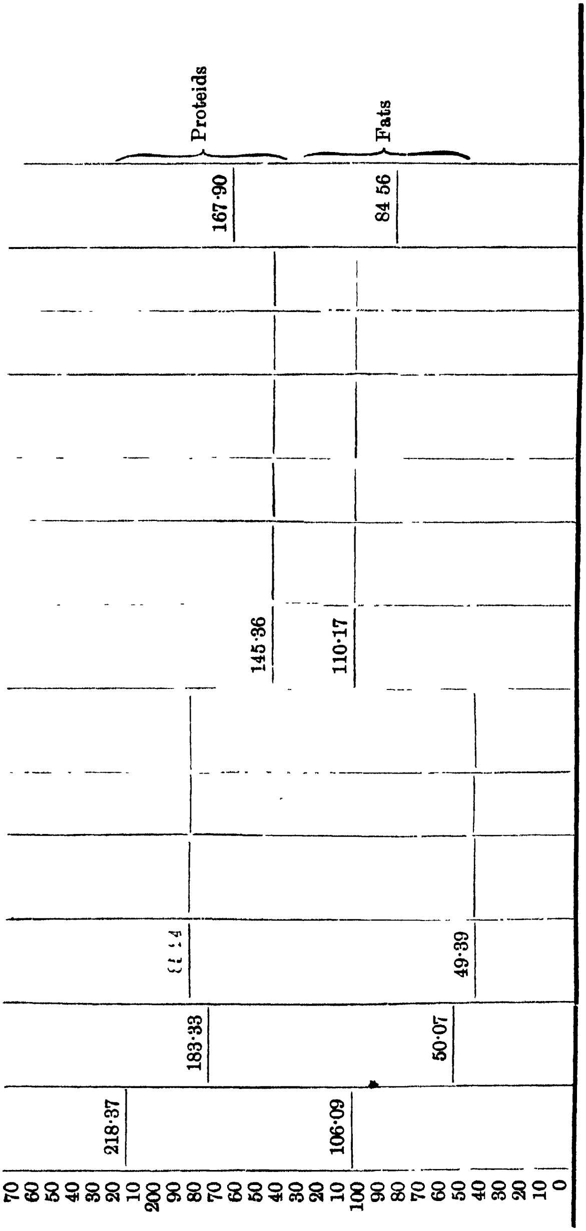
For work done on a horizontal plane at a rate of 75 metres to the minute, ·00055 calorie are expended per kilogrammetre supposing the men to be in fair training. The pace at which the detachment actually marched was 94 m. to the minute, and for every additional metre per minute ·0000024 calorie must be added per kilogrammetre; multiplying this factor by 19 we get a total of ·0000456 calorie to be added to the original factor. This amounts now to ·0005956 calorie per kilogrammetre. The mean average loaded weight of the men of the main party being 86·9 kg., to arrive at the average work done by each man on the horizontal plane it is necessary to multiply the length of each march in metres by ·0005956 by 86·9, or shortly by ·05. Since a great deal of the marching was done over rough grass, and bad roads, this must be taken as a minimal calculation.

For work expended in climbing. One kilogramme of weight raised through 1 m. vertically corresponds to 3·2 kilogrammetres of chemical energy expended. A similar calculation to that given above furnishes a factor (·65) by which to multiply the vertical distance climbed when ascertaining the calorie value of the work performed in this manner. The factors ·05 and ·65 are designated W and W′ in column 3 of Table X.

In addition to the above, 3,000 calories have been added to each day's work, as representing the ordinary work of the body during comparative rest. It must be remembered that the men were fairly actively employed during the non-marching hours, either on duty of various kinds, or in the first week of the experiment playing football or quoits. On the 13th, in addition to the short march performed, the morning was fully occupied in striking camp, carrying the tents and other camp gear and kits a distance of ¼ mile (the tents being thoroughly saturated with rain) and then repitching the tents. On the 18th the tents were struck, carried to the wagon and loaded up, together with the other camp gear and

TABLE IX.—TO SHOW DAILY AND AVERAGE AMOUNTS OF PROTEIDS, FATS AND CARBOHYDRATES WITH GROSS ENERGY VALUE OF THE SAME





Note.—The scale denotes grammes and calories. The latter on a scale $\frac{1}{10}$th of the former.

TABLE X.—TABLE SHOWING DISTANCES, HORIZONTAL AND VERTICAL, TRAVERSED BY EACH MAN OF THE DETACHMENT, LOYAL NORTH LANCASHIRE, ON EACH DAY OF THE MARCH, WITH TOTAL ENERGY EXPENDED.

(1) Date	(2) Distance in metres	(3)	(4) Calories	(5) Total calories	Factors
October 11 ..	Horizontal distance ..	22032·1288 × W =	1101·60644		W for horizontal distance = Calories expended per kg. metre × Average weight in kg. $\frac{0\cdot25}{427} = \cdot0006 \times 86\cdot9$ $= \cdot05214$ $= \cdot05$ Factor W′ for vertical distance = Calories expended per kg. metre × Average weight in kg. $\frac{3\cdot2}{427} = \cdot0075 \times 86\cdot9$ $= \cdot65$ Factor
	Vertical ,, ..	182·390 × W′ =	118·55350	1220·15994	
,, 12 ..	Horizontal ,, ..	21393·980 × W =	1069·6990		
	Vertical ,, ..	162·565 × W′ =	105 66725	1175·36625	
,, 13 ..	Horizontal ,, ..	8153·9320 × W =	407·69660		
	Vertical ,, ..	70·150 × W′ =	45·5975	453·29410	
,, 14 ..	Horizontal ,, ..	23557·5976 × W =	1177·87988		
	Vertical ,, ..	199·775 × W′ =	129·85375	1307·73363	
,, 15 ..	Horizontal ,, ..	24897·7488 × W =	1244·88744		
	Vertical ,, ..	313·845 × W′ =	203 99925	1448·88669	
,, 16 ..	Horizontal ,, ..	21688·4688 × W =	1083·42344		
	Vertical ,, ..	216·245 × W′ =	140·55925	1223·98269	
,, 18 ..	Horizontal ,, ..	6329·3888 × W =	316·46944		
	Vertical ,, ..	45·750 × W′ =	29·7375	346·20694	
,, 19 ..	Horizontal ,, ..	20748·1240 × W =	1037·40620		
	Vertical ,, ..	246·137 × W′ =	159·98905	1197·39525	
,, 20 ..	Horizontal ,, ..	27723·3688 × W =	1386·16849		
	Vertical ,, ..	339·770 × W′ =	220·85050	1607·01899	
,, 21 ..	Horizontal ,, ..	21595·8100 × W =	1079·79050		
	Vertical ,, ..	215·330 × W′ =	139·96450	1219·75500	
,, 22 ..	Horizontal ,, ..	25228·750 × W =	1261·4375		
	Vertical ,, ..	271·145 × W′ =	176·24425	1437·68175	
,, 23 ..	Horizontal ,, ..	13256·1944 × W =	662·80972		
	Vertical ,, ..	138·775 × W′ =	90·20375	753·01347	

kits. A spring being discovered to be broken, these articles had then to be unloaded and the tents repitched. Tents were again struck, packed and loaded at 4 p.m. and unloaded and pitched after the march in the evening. On the 19th tents were struck and loaded before starting, and kits and other camp gear packed and again unpacked at the end of the march.

TABLE XI.—Table showing Gross and Net Total Energy expended by the Detachment, Loyal North Lancashire Regiment, on each day of the March, between 9 a.m. on October 11, 1909, and 9 a.m. on October 23, 1909.

Day of march	Date	Gross total energy	Deduct	Net total energy	Remarks
1st	October 11	84403·20	*Nil*	84403·20	
2nd	,, 12	83507·32	*Nil*	83507·32	
3rd	,, 13	69065·88	*Nil*	69065·88	Camp struck and shifted by hand about ¼ mile
4th	,, 14	86554·67	*Nil*	86554·67	
5th	,, 15	88977·73	341·68	88636·05	Private Mostyn carried 5247·58 metres horizontal and 122 metres vertical
6th	,, 16	84479·66	932·86	83546·80	Private Mostyn carried 16420·88 metres horizontal and 172 02 metres vertical
7th	,, 17	60000·00	*Nil*	60000·00	
8th	,, 18	66924·14	*Nil*	66924·14	Camp struck, packed and loaded; unloaded and pitched in morning, the same repeated in afternoon
9th	,, 19	83947·90	*Nil*	83947·90	Camp struck, packed and loaded in morning
10th	,, 20	92140·38	1607·02	90533·36	Private Dillon remained in camp
11th	,, 21	84395·10	286·88	84108 22	Private Judge carried 5045·75 metres horizontal and 53·07 metres vertical
12th	,, 22	88753·63	1437·68	87315·95	Private Harvey remained in camp
	Total ..	972749·61	4606·12	968143·49	

Average per man .. .. 48407·17
Average per man per day .. .. .. 4033·93

This work has not been calculated, since the various items composing the total exertion are not easily estimated. On the 12th, and more especially on the 18th, they were severe and amounted to the equivalent of an ordinary march of ten miles or so in all probability. The men were certainly more jaded on the evening of the 18th than on any of the days in which ordinary distances were traversed.

The "gross total energy" in column 2 of Table XI is made up by multiplying the "total calories" in column 5 of Table X by 20, adding to these 3,000 also multiplied by 20, as representing the gross total work done in marching and internal body work by the whole detachment. The "net total energy" shown in column 4 of Table XI is arrived at by deducting from the figures in column 2 the amounts of energy over-estimated in that column, in respect of men remaining in camp or carried in the ambulance wagon, as explained in the notes attached to that table.

APPENDIX V.

Table showing the comparative value of total food consumed and total energy expended on the march by the twenty men of the Loyal North Lancashire Regiment. The days are counted from 9 a.m. on Monday, October 11, to 9 a.m. on Saturday, the 23rd. All work, internal and external, done and all food eaten during the period of twenty-four hours between 9 a.m. on the 11th and 9 a.m. on October 12 are included under the first day, and so on. The march shown in Table X as having been performed on the 23rd is not included, as this was carried out after 9 a.m. on that day, at which hour the terminal weighing was recorded. The figures for total energy expended are in accordance with those shown in Table XI, and show net values.

TABLE XII.—TABLE SHOWING THE COMPARATIVE VALUE, TOTAL FOOD CONSUMED, AND TOTAL ENERGY EXPENDED BY THE DETACHMENT, LOYAL NORTH LANCASHIRE REGIMENT.

Day	TOTAL FOOD CONSUMED		Total calorie value of food consumed	Total calorie value of energy expended
	Ration scale	Extras		
1st	II.	Cheese sandwich	73780·4	84403·20
2nd	III.	*Nil*	58937·2	83507·32
3rd	I.	,,	59610·0	69065·88
4th	I.	,,	59610·0	86154·67
5th	I.	,,	59610·0	88636·05
6th	I.	Rum ration	64022·0	83546·80
7th	IV.	*Nil*	62367·2	60000·00
8th	IV.	,,	62367·2	66924·14
9th	IV.	,,	62367·2	83947·90
10th	IV.	Whisky ration	66939·2	90533·36
11th	IV.	*Nil*	62367·2	84108·22
12th	IV.	,,	62367·2	87315·95
13th	*Nil.*	,,	*Nil*	*Nil*
Total			754344·8	968143·49
Average per man			37717·24	48407·17
Average per man per day			3143·1	4033·93
Deficiency per man			10689·93	
Deficiency per man per day			890·83	

APPENDIX VI.

After the weighing at 9 a.m. on October 23, which terminated the experiment so far as the effect of the ration on the men was concerned, a short march of about 8 miles was made, and the men weighed again at the termination of it. In the attached table the results of this supplementary weighing are given. They show the effect of an ordinary short march, on a mild damp day, in the direction of loss of weight due to loss of water by skin and lungs. The air was practically saturated with moisture, and the wet bulb rose from 54°F. at the beginning, to 56°F. at the end of the march. There was a fresh breeze, gradually increasing in strength from the south-west, with, in the last mile, a fine drizzling rain. The total distance traversed was 13,256 m. horizontally, with a vertical ascent of 138 m. (roughly, 8 miles and 460 ft.), and the total energy expended, on the average, 753 calories per man. The average loss of weight per man was ·81 kg. One man remained stationary, and had possibly had something to drink before weighing. All the rest lost. The maximum loss was that of Sharples, 1·9 kg., and Sullivan, 1·35. The following men lost more than 1 kg., viz.: Sharples, 1.9; Sullivan, 1·35; Nokes, 1·3, and Judge, 1·15.

One kg. of water is equivalent to about 1¾ pt., so that these figures are not without significance as to the loss in water-content of even well-trained men on a short march on a damp mild day.

TABLE SHOWING LOSS OF WEIGHT ON MARCH OF OCTOBER 23, 1909.

Name	9 a.m.	11.30 a.m.	Loss	Remarks
Colour-Serjeant Jeffreys	64·35	63·70	·65	9 a.m —Dry bulb, 55° F.; wet bulb, 54° F.
Lance-Corporal Cooke ..	67·10	66·35	·75	
,, Smith ..	68·30	67·70	·60	
Private Andio	62·45	62·45	·00	11 a.m.—Dry bulb, 56° F.; wet bulb, 56° F.
,, Broad	62·10	61·10	1·00	
,, Cooper	61·10	60·70	·40	
,, Currie	55·60	54·45	1·15	
,, Dillon	61·70	61·50	·20	
,, Flynn	58·00	57·40	·60	
,, Harvey	65 40	64·50	·90	Distance marched: 13,256 metres horizontal, 138 metres vertical.
,, Jones	64·40	64·00	·40	
,, Judge	60·05	58·90	1·15	
,, Killinger ..	67·00	66·10	·90	
,, Mostyn	60·30	59·60	·70	Calories expended on the average, 753 per man.
,, Nokes	60 30	59·00	1·30	
,, Pushman ..	62·45	61·45	1·00	
,, Sullivan ..	74·45	73·10	1·35	
,, Sharples.. ..	71·40	69·50	1·90	
,, Walsh	62·15	61·75	·40	
,, Wilde	60·60	59·70	·90	
Totals	1269·20	1252·95	16·25	
Average	63·46	62·65	·81	

Echoes from the Past.

GABRIEL RICE REDMOND: INSPECTOR-GENERAL OF MILITARY HOSPITALS.

By GABRIEL O'C. REDMOND, M.R.C.P.I., Cappoquin, Co. Waterford.

THE subject of this memoir, a distinguished medical officer of the Army, was the eldest son of John Redmond, Esq., of Killygowan, co. Wexford, and Newton in the same county, and of Charlemont Street, City of Dublin. He was born in 1763, either at Killygowan or Newton. His mother, Catherine, was the eldest daughter of John Cooke, of Cookestown, Co. Wexford, the last male representative of Sir Richard Cooke, Kt., a grantee, in James I.'s reign, of 2,000 acres in County Wexford. Gabriel Redmond was a distant cousin of the Duke of Wellington. Christopher Peyton, Auditor-General in Ireland, 1611, having two daughters, one of whom married Sir Henry Colley, an ancestor of Arthur Colley Wellesley, Duke of Wellington. The second daughter married Sir Richard Cooke, Chancellor of the Exchequer, 1611, from whom Gabriel Redmond was descended in the female line.

Although he was heir to an entailed estate in the county Wexford, Gabriel Redmond determined to take up the profession of medicine, and with that object entered Trinity College, Dublin, in 1785 or 1786. He there pursued his studies with great zeal, and after a brilliant career obtained his degree of M.D. During the holidays, which he spent at his home, he applied himself with commendable energy to the prosecution of his medical studies under the tuition of Dr. Jacob, a skilful practitioner.

His future career was a subject of frequent discussion with his father. He had no desire to settle down as a general practitioner, but steadfastly maintained a predilection for an army medical career, and having obtained his father's consent he was gazetted Surgeon to the 126th Regiment of Foot on August 22, 1794. This Corps was raised in that year as the Earl of Mountmorres's Regiment, it was disbanded in 1796. On September 16, 1795, Gabriel Redmond became surgeon to the 28th Foot, now the first battalion of the Gloucestershire Regiment. The regiment was then stationed in Ireland, but shortly afterwards embarked for Quebec, only to be recalled and sent to the West Indies. The transports conveying the troops met with a succession of furious gales, and only four companies of the 28th succeeded in reaching

Your [illegible] Richmond

the West Indies, the headquarters and six companies of the regiment being driven back to England, where they remained till the autumn of 1796 when they embarked for Gibraltar. The four companies which reached the West Indies were there attached to the 14th Regiment, with whom they were employed at the taking of St. Lucia, and subsequently joined their headquarters at Gibraltar. Surgeon Redmond was with the four companies in the West Indies. In 1798 the regiment formed part of the force which successfully attacked Minorca.

In 1799 Gabriel Redmond was appointed "Surgeon to the Forces and Garrison Surgeon."

During his service in Minorca he met his future wife, Miss Philadelphia Barbara Douglas Johnstone, daughter of John Johnstone, of Grenton, Dumfriesshire, formerly an officer in the 3rd Regiment of Foot (The Buffs). The marriage took place in Minorca in 1801. In 1802 Gabriel Redmond was obliged to return to England on account of ill-health. In 1803 he was promoted to the rank of Assistant-Inspector of Hospitals, and served in that appointment at home till 1807, when he accompanied the British forces under General Whitelock in the attempt to capture the Argentines. Reports show that he acted as Inspector of Hospitals to the troops in Monte Video in 1807.

In 1809 he returned to England and served there till 1812 when he was ordered to Quebec, there to report himself to Sir George Prevost, Governor-General in Canada. In the Army lists of that year he is shown first as Deputy-Inspector Medical Department, and at a later date as Inspector Medical Department, September 3, 1812. He served during the American War with ability and had to endure many hardships. He has left an interesting diary, from which we give a few extracts to show the state of the medical department of the Army in Canada 100 years ago.

DIARY OF INSPECTOR REDMOND, 1812 TO 1813.

"Journal of occurrences from the 27th August, 1812, the evening I embarked with Phyllis, Anne [His wife and daughter, ED.], and a man and maidservant, on board the 'Coleworth' Victualler, No. 31 . . . . Master, at Portsmouth for Quebec, where we arrived after a tedious and stormy passage on the 18th October. We had nearly been lost in the Gulph of St. Lawrence in a gale of wind in consequence of the wind suddenly taking the ship aback at twelve o'clock at night, and if all hands had not turned out quickly, the

Ship would have gone to the bottom. The dead-lights were in nearly the whole of the passage."

On October 19, he reported his arrival to Major-General Glasgow commanding the garrison of Quebec. On October 24, he received orders to proceed at once to Montreal, where Sir George Prevost, the Governor-General, then was. The journey of 180 miles had to be travelled by stage coach over very indifferent roads; it occupied two days and was exceedingly uncomfortable. On reporting himself to the Governor-General he was ordered to proceed to Upper Canada at once to report on the state of the hospitals and medical department. Some of the notes made by Inspector Redmond during his journey are worth reproducing to show the condition of affairs existing at that time.

River Raison: "Here Colonel McMillen commands, and with him 300 of the Glengarry Militia. There was no hospital nor any medicines, and the Colonel complained that his men had not blankets."

Brookville: "There were only 60 men 1st County Leeds Militia commanded by Colonel Brackenridge stationed at Brookville. Mr. Hepill, the surgeon, was in want of every article of medicine, &c., and the sick go to their own homes whenever they like."

At Kingston he embarked on the "Earl Moira," sloop of war, for Niagara; after proceeding ten leagues the ship anchored for the night, and next day the wind being foul, returned to Kingston. He then proceeded by road, but the guide lost his way and for a considerable time they wandered about in a wood with heavy rain falling all the time. The party finally managed to find an Indian hut in which they passed the night. Next morning they again lost their way in the wood, but managed to secure the services of an Indian boy who showed them the way. At York he inspected the hospital and found it to be "a miserable one. It was an old condemned house and could not hold more than 12 patients" . . . . . "Mr. Lee (the surgeon) had few medicinal or purveyor's stores, particularly articles for wounded men."

14th (November), Fort George, or Niagara: "Inspected the hospitals and barracks again and went round the quarters of the Militia with Colonel Bishop, Inspecting Field Officer; found them all very much out of repair, dirty, and the windows broken." . . . . "Arranged with Colonel Bishop that a steady non-commissioned Officer from each Militia Corps was to collect the sick men at 10 o'clock every morning and take them to the staff surgeon."

15th (November) . . . "The Militia sergeants were not able to collect the sick. Those that gave in their names were gone home, some without leave."

19th (November): "No possibility of getting to Kingston by sea as the ships were chased by the American squadron beyond the Ducks Islands, and will not venture out of Kingston Roads again, as it is time to lay them up for the winter, and until the frost sets in so that we can travel in sleighs, we must remain at York."

After a prolonged tour, amid much discomfort due to the cold weather, the bad state of the roads, and accommodation available in roadside inns, and further increased by an inflammation of one leg and a fracture of two ribs resulting from a fall, Inspector Redmond arrived back in Montreal on December 2, 1812.

He proceeded by sleigh to Quebec, and seems to have had an unpleasant journey to judge by the notes in his diary, of which the following is a fair example: "We had a dreadful day's journey to-day. Our sleigh horse got tired and we did not get to Machiche until late at night. Six upsets to-day. My side at times gave much pain." While in Quebec Inspector Redmond furnished a report on the state of the hospitals in Upper and Lower Canada. He describes them all as "miserably bad," and states that the medical and purveyor's stores were very deficient, most of the latter having been in use during the last American war. He hired an office and a clerk, and busied himself in making out requisitions and looking over returns. He complains that all the returns furnished by the regimental surgeons were wrongly made out and that he had to send them all back for correction, a proceeding which must have occupied some time considering the difficulties of communication at that time.

On February 7, 1813, he became very ill with symptoms of some liver trouble. The attack lasted for three weeks and left him in such a poor state of health that a medical board recommended him to proceed to England as soon as the river opened. During this illness his wife gave birth to a son.

The diary contains many pages full of shrewd observations on the condition of Canada, its peoples, crops, climate, &c.

On June 29, 1813, he embarked with his family on board the "Fortitude," Transport No. 67, for passage to Portsmouth, where he arrived on August 3 after an uneventful voyage, during which, however, his health did not improve appreciably.

On arrival in England he was given long leave of absence and went to live in County Wexford at his old home. On July 25, 1814, he was placed on half-pay with the rank of Inspector, Medical Department. His health continued to be bad, and in consequence he applied for a pension and was awarded £300 a year; in 1819 this pension was withdrawn. Fortunately he succeeded to his father's property about this time and was therefore enabled to live with comfort. A baronetcy was offered to him on account of his good services, but he declined it. He then resided for a number of years in Caen, Normandy.

In 1831 he was promoted to the rank of Inspector-General of Military Hospitals. He died at Mount Henry in 1832, and was buried in the family vault in Meelnagh churchyard.

Reviews.

A MONOGRAPH OF THE ANOPHELINE MOSQUITOES OF INDIA. By S. P. James, M.D., D.Ph.H., I.M.S., and W. Glen Liston, M.D., D.P.H., I.M.S. Second edition, re-written and enlarged. Calcutta: Thacker, Spink and Co., 1911. Pp. 128. 15 coloured plates.

In the preface to the new edition of this well-known work, the authors say that, "the purpose of the book is to aid in the correct determination of specimens," and they may be congratulated on having achieved their purpose admirably.

Necessarily the book is of special importance to army medical officers in India who are interested in the practical prevention of malaria, and to them it ought to prove invaluable as a work of reference. In it they will not only find at the cost of little labour the general working principles useful to them in the separation of anopheline mosquitoes, domestic or wild, from others, but also the details necessary to assign any particular specimen to its own genus and species.

The pure dipterologist, on the other hand, will find in it points that require confirmation and gaps that require filling.

Some minor faults are apparent, in all probability due to the process of re-writing. For example, on pp. 32-33, the references to the plates are incorrect in five places, though reference to the list of illustrations enables one to find the plates referred to in the text.

An index of Indian species of anophelines is given at pp. 127-128, but the absence of an index to the letter-press must be regretted in a book which must function mainly as one of reference. The illustrations, and more especially the coloured plates, leave nothing to be desired.

A.B.S.

THE PREVENTION OF MALARIA IN THE FEDERATED MALAY STATES. By Malcolm Watson, M.D., D.P.H. With a preface by Ronald Ross, C.B., F.R.S., &c. Published by the Liverpool School of Tropical Medicine. Price 7s. 6d.

This most interesting account of the war which for the past eight years has been waged against malaria in the Federated Malay States, is all-important to those who are engaged in the prevention of this disease in the tropics, to whom it cannot fail to be a very useful guide. To those also whose interest lies chiefly in the administration of those countries where the disease prevails, the demonstrations afforded of the economic value of anti-malarial measures, best exemplified perhaps in the case of Port Swettenham, must appeal strongly.

One of the most important points to health officers is the demonstration that such measures cannot be applied by rule of thumb, but must be varied to suit the local conditions after full investigation of the habits of the local anopheline carrier, or carriers of the parasite. In Malay, for instance, the opening up of the jungle by felling, together with drainage, is sufficient in the flat lands, where the chief carrier is *Myzorhyncus umbrosus* X., a pool breeder, to abolish malaria from the cleared areas; while similar treatment wholly fails to produce the same effect in the hilly land, where the chief carrier is *Nyssorhyncus willmori*, whose breeding place of election is the running water of springs and hill streams, however clear these may be of weeds. To those who sometimes have been puzzled in India by the amount of malaria occurring in a district where the conditions did not appear very favourable for its propagation, a consideration such as the above may give a clue to the elucidation of the mystery.

Again, the demonstration of the fact that the amount of malaria in any given set of coolie lines is directly dependent on the distance of those lines from unopened and undrained jungle will prove consoling to those who consider that the anti-mosquito operations of many Indian cantonments are likely to be of little effect. It is, for instance, shown that when the lines are within 200 yards of such undrained jungle the spleen rate of the children averages 50 per cent, while when they are at a distance of 1,000 yards, the spleen rate drops to practically nil.

As the author points out, it does not, however, follow that what has been found to be the case in Malay will also necessarily apply to other localities, but he draws an interesting parallel between the conditions obtaining in Malay and those found to exist in Bengal in 1902 by the Commissioners of the Malaria Committee of the Royal Society. In this connection also he suggests a possible cause for the attitude of the Italian school, which now considers quinine to be the most valuable of the anti-malarial measures to be adopted.

The observations upon the depressing influence of malaria on the birth-rate are of much interest and importance.

The author's conclusions as to the uses and limitations of quinine may not be accepted by all, but here again the local conditions must largely influence the opinion arrived at, and it does not follow that, though quinine has a limited value among the coolies of Malay, it may not prove extremely useful in an Indian cantonment. In addition the difficulty, on which the author insists, of distinguishing between relapses and re-infections, makes it almost impossible under present conditions to arrive at a true idea of the value of the drug. He considers that many attacks of malaria which have been usually considered in the past to be relapses are in reality re-infections, an opinion which we have held for some time past.

Of the three chief anopheline carriers found in Malay, two viz., *N. willmori* and *N. karwari* occur in India, while the third which the author has provisionally called *M. umbrosus* X, may be identical with or a variety of *M. barbirostris*, which also occurs in Inda.

The letter-press is freely interspersed with excellent plans, photographs and tables which are of great value.

A. B. S.

QUARTAN MALARIA AND ITS PARASITE. With especial reference to the occurrence of this form of malaria in the Canal Zone. By W. M. James, M.D., Ancon Hospital, C.Z. Reprinted from the Proceedings of the Canal Zone Medical Society. Vol. 3, April to September, 1910. Pp. 32.

This pamphlet contains the results of a detailed microscopical study of the parasite in a number of cases of quartan malaria, which occurred in the Canal Zone during the years 1904 to 1910 and brings forward some points of special interest.

There seems to have been some doubt, mainly clinical and largely based on the irregularity of the fever (copies of eight temperature charts are included) as to whether they were actually cases of quartan malaria, but the description and the figures given of the microscopical findings leave little doubt in the mind that they were of this variety. But this very irregularity, as compared with the classical fourth day rise, usually seen in quartan malaria in India for example, is interesting.

Reduction of the gametocytes by means of the extrusion of two polar bodies, thus bringing it into line with other malarial parasites and other sporozoa, is described in this form of the parasite, so far as we are aware, for the first time. The distinction, however, between gametocytes and gametes does not always seem to have been sharply drawn.

In the sporogenous cycle, apart from the male and female gametocytes, a third form is described, though not in great detail, which does not extrude polar bodies and which, it is suggested, may be the form which is concerned in the parthenogenetic origin of relapses. The opinion is expressed that "if there be a form of the parasite responsible for relapses it should be most readily demonstrated in quartan infections." We, however, had formed the opinion that the demonstration ought to be most easily made in the case of the æstivo-autumnal (malignant tertian) gametocytes. Owing to their characteristic shape any changes of the nature of those described by Schaudinn as parthenogenetic ought to be clearly distinguished.

The comparative rarity of this form of parasite is well demonstrated, and corresponds with Indian experience.

An important point, viz., that of the anopheline implicated in the carrying of this parasite and the difficulty of infecting anophelines with it is touched upon, though no definite conclusion seems to have been reached.

The question of "intra-corpuscular conjugation" is referred to as a hypothesis advanced by Craig. The same process had been described some years previously, at least as early as 1904, by Ewing. The author was unable, in common it may be said with many other observers, to confirm the finding.

The little pamphlet may be commended to any army medical officer who has the opportunity of making observations upon any of the varieties of malarial parasites, for it encourages thought in some of the directions in which more information would seem to be essential before marked progress can be made—in India, at all events, in the further prevention of one of the most important causes of inefficiency among troops.

A. B. S.

THE REDUCTION OF DOMESTIC MOSQUITOES. By Edward Halford Ross, M.R.C.S.Eng., L.R.C.P.Lond., Liverpool School of Tropical Medicine. With illustrations. London: John Murray, 1911. Pp. x + 114. Price 5s. net.

The object of this book apparently is to show that, by means of a carefully conducted campaign against mosquitoes of the varieties found breeding in the immediate surroundings of dwellings in a hot climate, not only may an irritating pest be removed but also the general sanitary conditions will be improved, and "fevers," especially some of those the causation of which has not yet been well determined, will be reduced. Some of these results might perhaps have been taken for granted, and as regards the remainder the object would perhaps have been better achieved had the amelioration found in the case of Port Said (the anti-mosquito operations of this town form the basis of the book) been set forth in more categorical fashion. We are being educated to the pitch of expecting the expression of all such improvements in definite numerical values and consequently experience some disappointment at the absence of them from this book.

We confess to feeling that, under similar circumstance, we should like to be able to make a more definite case before recommending an administrative authority to go to serious expenditure on similar measures.

We are not unused to seeing the habits of the female mosquito described in romantic, tragic or other fashion, and the descriptions given here led us to refer to the sub-title of the book "Instructions for the use of Municipalities, Town Councils, Health Officers, Sanitary Inspectors, and Residents in Warm Climates," which probably supplies the explanation for the style used, if we remove health officers from the list of those to be instructed.

A. B. S.

CATTLE BREEDERS' ASSOCIATIONS IN DENMARK. By Frederick Rasmussen. Pp. 40. Unpriced. Washington, U.S. Government Printing Office, 1911.

This is the 129th bulletin of the U.S. Bureau of Animal Industry, and like all the publications of the Bureau, contains work of the first interest, well edited and carefully written.

It has little special interest from the medical or public health point of view, but is of considerable general interest and is worthy of note.

Up to sixty years ago cattle were of little importance in Denmark, which was essentially a grain-producing country. As the soil became deprived of its fertility the livestock industry began to develop but at first largely for the production of beef. From 1860 to 1880 was a period of transition from beef to milk production, and the relative merits of the two industries were often measured by comparing the cost at which manure was produced.

Since 1880 Denmark has been essentially a dairy country and the Government has been at great pains and expense to improve the methods of production in every way.

The bulletin describes the manner in which the breeding of cattle is supervised. There are many cattle-breeding associations, all recognized by Government and receiving Government assistance. Each association keeps a bull which is only allowed to serve cows selected by a committee of the Association. The bulls must be sound and must have attained recognition at a show. They are bought by means of loans and each is kept at the expense of the association by one of the members. They must be examined twice a year and passed sound by a recognized veterinarian. The price paid for the bull frequently depends on its subsequent achievements, the price being so much in cash and a further amount depending on its subsequent offspring and show-ring premiums.

In judging cattle in the shows points are given for pedigree, and for the yield in milk-fat of the animal and of its ancestors. An average of 3·2 per cent. fat is the minimum and the records have to be authenticated by cow-breeding associations.

The Government of Denmark, which has a population of about two and a half millions, contributes about a quarter of a million pounds a year for the promotion of agriculture, of which more than a fifth is devoted to the promotion of breeding and keeping of domestic animals.

As a result of the development of cattle breeding the average milk production has risen from 2,200 lb. per cow per annum in 1866 to 6,600 lb. at the present time, a truly remarkable result, especially when it is remembered that this is from the development of native breeds and not owing to the introduction of new strains.

C. H. S.

THE ERRORS OF ACCOMMODATION AND REFRACTION OF THE EYE AND THEIR TREATMENT. A Handbook for Students. By Ernest Clarke, F.R.C.S. Third Edition. London: Baillière, Tindall and Cox, 1911. Pp. 228. Price 5s. net.

The third edition of Mr. Clarke's well-known and valuable handbook has been carefully revised and brought up to date. The entire freedom from typographical errors is a noticeable feature and indicates meticulous care in proof-reading; anyone who has written on refraction and retinoscopy is familiar, from bitter experience, with the astounding mistakes printers can make when proofs are perfunctorily read.

Mr. Clarke has in very marked degree the gift of lucid expression. This quality of lucidity is most valuable in the chapter on "Heterophoria and Squint," subjects on which there is much confusion of thought amongst non-specialists. The illustrations are good, and in the right positions as regards the illustrated text—an important point.

The "Vision Tests for the Services" (Chapter XIX.), have been brought up to date and include the Civil Service, Police, Railway Servants, &c., as well as the Army and Navy. As colour vision has to be tested, it would, perhaps, be well in future editions to describe the modern methods of detecting colour-blindness, although strictly speaking the subject does not come within the scope of the book. The remarks on malingering might be amplified with advantage: the subject is becoming of increasing importance in view of modern social legislation.

Officers of the Corps would do well to add this little manual to their personal stock of books, or at all events secure it for their hospital library.

M. T. Y.

VERÖFFENTLICHUNGEN AUS DEM GEBIETE DES MILITÄR-SANITÄTSWESENS. MEDIZINAL-ABTEILUNG DES KÖNIG: PREUSS: KRIEGSMINISTERIUMS. Heft 49, I., "Die Heranziehung und Erhaltung einer wehrfähigen Jugend." Lecture by Dr. Lothar Bassenge, Stabsarzt im Kriegsministerium.

This lecture contains a powerful appeal for the establishment of some form of physical training for youths during the period which elapses between leaving school and joining the colours to undergo military training.

In a telling introduction, Bassenge quotes Friedrich Ludwig Jahn, who, over one hundred years ago, wrote: "Only when all able-bodied men have made themselves fit to bear arms, have practised the use of arms, are ready and willing to fight for love of their country, can a nation be strong."

To-day, as at all times, the safety of a nation lies in its armed strength. Only when a nation is able to support its wishes by armed force does it gain a hearing among the Powers; without armed force its just demands are disregarded and its friendship is not worth having. Armed strength restrains the warlike tendencies of its neighbours and is the best guarantee of peace.

During the last one hundred years Prussia has maintained universal service; generations and generations of her sons have been trained to become efficient soldiers, her able-bodied males have devoted their physical and intellectual energies to the defence of their country, and have effected the elevation of Prussia and the re-birth of Germany.

The whole of the country's male youth does not, however, serve in the army, partly because there is not sufficient room for all in the ranks, but, unfortunately, also because a certain proportion is not physically fit to serve.

It is with the causes of physical unfitness that Bassenge's lecture deals.

The larger percentage of recruits physically fit to serve has always come from the country inhabitants. In 1871, 64 per cent of the inhabitants lived in the country as against 36 per cent in towns. In 1905, the percentage of the people living in the country had fallen to 42·5 while the percentage of those living in towns had increased to 57·5.

In 1909, there were 1,226,730 due to fulfil their military service; of these 550,326 were finally disposed of. The number found fit to serve in the active Army was 294,711, equal to 53·55 per cent. The country inhabitants showed a percentage of 57·9 physically fit, while among town dwellers the percentage was only 49·01. The larger the town the poorer the physique of the recruits, Berlin being the worst of all; on December 1, 1906, there were only 8,565 Berliners actually serving, or 13,156 short of the proper number. The actual number of physically fit recruits is steadily increasing. In 1906, there were 1,037,919 boys born in Germany and it is reasonable to expect that in 1926, 700,000 of these will be living. If only 50 per cent of them are fit this would leave 350,000 recruits fit for service, or, if the establishment of the army is not meanwhile increased, some 75,000 more than are wanted for the annual contingent.

Nicolai and Schwiening made a special investigation of the physique of one-year volunteers. Among 52,650 the percentage of fitness was 65, among those studying agriculture, forestry and allied subjects 83.4 per cent were found fit, whereas among the *gymnasists* only 62·2 per cent were fit. The main causes of unfitness were poor physique, diseases of the heart and defective vision. Out of every one hundred *gymnasists* thirty-seven were suffering from defective vision and for each short-sighted soldier there were eleven short-sighted one-year volunteers.

Training of Youth for Military Service.—The great majority of youths leave school between 13 and 14 years of age and immediately take up some trade. The principal growth of the heart and lungs, as also of the body, generally takes place between the 14th and 18th years of life. During this period most of the youths are engaged in earning their living and frequently under somewhat unhygienic conditions.

The general mortality ratio has steadily declined in Germany from 29 per 1,000 living inhabitants in 1870 to 19 per 1,000 in 1907. The death-rate among infants under 1 year of age has not decreased and still remains at about 20 per cent of all children born. At the same time the birth-rate is slowly falling; in 1879 it was 40·01 per 1,000, and in 1907 it had decreased to 33·2 per 1,000. The preservation of infant life is, therefore, of the greatest importance to the nation, and the subject is receiving earnest attention from public bodies and private associations.

Bassenge then proceeds to discuss school hygiene and to show what is being done to maintain the health of the pupils during these years. Free gymnastics, marches, exercises with iron bars to represent a rifle, &c., are employed to improve the boys' physique. V. Schenckendorff, in 1891, founded his association for the encouragement of national games; an off-shoot of this association has been formed to encourage physical training with a view to maintaining the national fitness for military service. This association has introduced a number of games and has provided many playing-grounds for youths.

Organized walking tours for school-boys have also become general; each youth carries his own kit and cooking utensils and sleeps at night in a barn.

The real trouble is to provide for the youth when he leaves school. Bassenge describes the organizations existing in other countries and shows that apart from the German Turnvereinen little has been done as yet in Germany to prevent physical deterioration taking place during the interval between leaving school and coming up for military service. To remedy this he hopes to see societies spring up in all parts of Germany to encourage the culture of physical fitness. C. E. P.

THE ARMY IN THE FIELD, COMPILED FOR THE USE OF MEDICAL OFFICERS. (Die Armee in Felde. Auszug aus den einschlägigen Vorschriften für Militärärzte.) By Maximilian Ritter v. Hoen, Lieutenant-Colonel General Staff, and Dr. Marian Szarewski, Regimensartz. Pp. 48. $9\frac{5}{8}$ by $6\frac{1}{4}$. Safar. Vienna, 1910. Price 1s. 6d.

This small book consists of extracts from the official manuals giving such information about an army in the field as a military medical officer ought to be acquainted with.

The first section shows the organization of the army by brigades, infantry divisions, cavalry divisions, army corps and armies. The staff and composition of each of these is given. The personnel, equipment and transport of the medical units is given in detail.

The second section deals with supplies in the field. It shows what each man carries; the scale of travelling kitchens allowed for units and the extra rations carried on them, as also the scheme of supply columns, parks and depots for an army.

A short chapter is devoted to a review of the organization and working of the lines of communication. The rules to be observed in writing reports, orders and messages are briefly stated and examples given. The book concludes with some tables showing the strength of and road space required by different units.

It should certainly prove of great help to medical officers of the Austrian Army as it presents, in a compact form, a great deal of useful information which would otherwise have to be picked out from a number of official books.

C. E. P.

TACTICAL CONSIDERATIONS FOR THE DIRECTOR OF MEDICAL SERVICES OF AN ARMY. (Die operative und sanitatstaktische Tätigkeit des Armeechefarztes.) By Maximilian Ritter v. Hoen, Lieutenant-Colonel General Staff, and Dr. Marian Szarewski, Regimentsartz. Pp. 31. $9\frac{5}{8}$ by $6\frac{1}{4}$. Safar. Vienna, 1910. Price 1s. 9d.

This work gives a brief review of the duties which have to be carried out by the Director of Medical Services with an army in the field. Some useful points are given to guide him in arranging his scheme for the disposition of medical units in different military situations, but most of the book is devoted to the problem of collecting and evacuating the sick and wounded. An appendix contains four diagrammatic maps showing the distribution of the medical units and the routes by which the sick and wounded are evacuated when the army is on the march, during a period of non-activity, immediately before and after a battle.

C. E. P.

Current Literature.

Note on the Ætiology and Treatment of Beri-beri.—By Méd. Major Dr. Thézé (*Annales d'Hygiène et Médecine colon.*, No. 1, 1911).—In beri-beri the quantity of urine passed is greatly diminished, this is especially marked in severe cases. The urea is also diminished to frequently less than 5 grm. per litre and the total excretion may be as low as 4 grm. in the twenty-four hours. The quantity of uric acid is also somewhat below normal.

The excretion of phosphates is in rare cases increased, but more usually it is somewhat less than normal. As soon as convalescence sets in marked phosphaturia occurs.

The normal proportion of phosphoric acid to urea in the urine of natives may be taken as 1 to 8; as the disease becomes more pronounced the diminution in the quantity of phosphates excreted is less than that of the urea and the above ratio is altered accordingly. Thus in a case which terminated fatally on July 5, the total urine excreted on June 25, was 460 grm. and the ratio of urea to phosphates was 1 to 9; by July 1, the ratio had become 1 to 5·4. When recovery sets in the ratio alters in the reverse direction and the total quantity of urine excreted rapidly rises.

Thézé, in addition to giving only partially decorticated rice, makes use of lecithin either in the form of pills 0·5 grm. daily, or as an intramuscular injection 0·3 grm. dissolved in oil. The improvement is rapid and when well established the lecithin may be gradually reduced. In mild cases he recommends the yolks of eggs. C. E. P.

Anæsthesia, by Klapp's Method (Oberarzt, Dr. Eltester, *Deut. Militärärzt. Zeitschr.*, August 5, 1911).—Klapp observed that children, anæmic people and those who had just lost a large quantity of blood are much more easily anæsthetized than healthy adults. He therefore came to the conclusion that the quantity of the anæsthetizing agent required bears some definite relation to the volume of the circulating blood. Experiments were made on rabbits to test this theory. As much blood as possible was forced into the limbs and retained there by elastic tourniquets; under these conditions a much less quantity of the drug was required to produce full anæsthesia.

This plan has been successfully employed in a number of major operations in the military hospitals of the VII. Army Corps.

Immediately before beginning the administration of the anæsthetic, as much blood as possible was forced into the lower limbs and an Esmarck tourniquet applied to retain it there. The arms were not made use of, as their vessels have much less capacity than those of the lower limbs and the application of a tourniquet is always liable to cause some damage to the nerves.

Full anæsthesia was rapidly induced and the stage of excitation was transient or absent even in the case of alcoholics. After applying the tourniquets the pulse-rate increased slightly, but after their removal there was a marked increase in the rate for five to ten minutes. Vomiting hardly ever occurred during or after the anæsthesia.

The most noticeable feature was the small quantity of anæsthetic used. For an operation lasting one to one-and-a-half hours the average consumption of chloroform was only 20 to 30 grm. ($\frac{2}{3}$ to 1 oz.).

The return to consciousness was always rapid and easy. The blood, which was shut off from the general circulation during the operation, had lost most of its oxygen and become surcharged with carbonic acid gas. When readmitted to the general circulation the carbonic acid gas acted as a powerful stimulant to the respiratory centre. As this blood contained no chloroform it also had the effect of lowering the percentage of chloroform in the blood as a whole and so expedited the return to consciousness. The nausea which usually follows general anæsthesia was very slight or absent. No discomfort was felt from the application of the tourniquets.

This method presents great advantages to the military surgeon owing to the economy in chloroform used and the time required to induce anæsthesia and for the return to consciousness. C. E. P.

The Treatment of Gonorrhœal Arthritis. — Hildebrand (*Berlin Klin. Wochenschr.*, No. 31, 1911). Hildebrand has treated a number of cases by injecting 5 grm. of tincture of iodine into the inflamed joint. During the first few days following the injection there was an increase in the amount of effusion, but this soon disappeared, and there was no further collection of fluid. Pain soon ceased, and the mobility of the joint rapidly improved. Ankylosis did not occur in any of the cases. Hildebrand thinks that the iodine acts by killing any gonococci lying free in the effusion, by penetrating the synovial membrane and killing the gonococci there and finally by causing a local rise of temperature which has the effect of lowering the vitality of any gonococci not directly acted on by the iodine. C. E. P.

The Results of an Intramuscular Injection of Salvarsan.—Tomasczewski (*Berlin klin. Woch.*, No. 32, 1911, p. 1485). A patient supposed to have a syphilitic cerebral tumour received an injection of salvarsan in July, 1910. He died six months after. At the post-mortem examination no abnormality could be detected on palpating the muscle at the site of the injection. On section an area of necrosed tissue about the size of a walnut was found in the gluteus, in the centre of which the microscope showed the remains of the salvarsan. New granulation tissue was in course of formation around the necrosed tissue.

In another case a child died fourteen days after receiving an injection of 0·01 grm. of salvarsan. The resulting necrosis of the muscle extended to close to the sciatic nerve. A microscopic preparation of the nerve showed that the nerve fibres had been forced apart, and the spaces filled with a small cell infiltration. The neighbouring blood-vessels had also become thrombosed. C. E. P.

Note on the Preparation of Dry Iodized Catgut.—By Generaloberarzt Herhold (*Deut. med. Woch.*, No. 28, 1911). Herhold prepared catgut according to the method described by Moschkowitz (*Annals of Surgery*, January, 1911) by soaking it in 5 per cent. tincture of iodine for several days, and then drying it. With inferior gut this process reduces its liability to break when being tied. Any tendency to brittleness can be removed by placing it in sterile water for a few minutes before use. Catgut prepared in this way was dipped into bouillon cultures of streptococci, and then laid on agar plates; no growth resulted. Gut sterilized by steam only and dipped into a similar culture produced profuse growth. C. E. P.

Army Medical Report, Austrian Army, for the Year 1909.—The total admission rate for all diseases was 845·2 per 1,000 of strength, which shows a continued increase (1907 = 826·5; 1908 = 833·2); the mortality was 2·21 per 1,000.

The admission rates per 1,000 strength for the more important diseases were as follows: Typhoid fever, 1·7; tuberculosis, 4·5; trachoma, 5·1; venereal diseases, 54·7; middle-ear disease, 8·2; pneumonia, 4·1; pleurisy, 5·5; articular rheumatism, 11·0.

The incidence of venereal disease in the Army generally does not show any diminution. C. E. P.

Military Medical Manœuvres at Vincennes.—(*Figaro*, June 25, 1911).—A clearing hospital was established on the racecourse of Vincennes. Beds were got ready in the empty stables, and dressings prepared in anticipation of the arrival of a convoy of wounded. As the wounded had to be provided with a full meal, this was cooked in the new pattern wheeled kitchen burning petrol, which can prepare 500 rations of soup, meat, and vegetables in one-and-a-half hours. The convoy was expected about 10 a.m. from Gravelles, 21 miles distant.

The vehicles employed for transporting the wounded were seven motor lorries, four light motor cars, and one motor taxicab. The tops of the motor cars had first been removed and replaced by the "Brichot" apparatus. This consists of a framework taking three tiers of stretchers; if the motor car is roomy, two "Brichot" apparatus can be fixed in the chassis, so that six lying-down wounded may be transported at once. These converted cars, loaded with wounded, travelled at the rate of 22 miles an hour, and the patients stated that they did not feel any jarring or shaking.

The motor lorries were converted into ambulance transport by fixing chains to uprights, and suspending the stretchers from the chains. Each lorry carried from twelve to sixteen wounded, according to its size. The lorries only travelled at the rate of four and a quarter miles per hour, but the wounded patients complained of severe jolting.

There was also a successful demonstration by trained ambulance dogs in searching for wounded. Captain Tolet, who is in charge of the Government training kennel for ambulance dogs at Fontainebleau, and has twenty-four dogs under training there, is so convinced of the value of ambulance dogs in war that he wishes to invite all owners of sheepdogs to send their dogs into the Fontainebleau kennel for training in ambulance work.

A mobile X-ray apparatus was also shown. The manœuvres were attended by a large number of medical officers of the reserve.

C. E. P.

Diets in French Military Hospitals.—Fresh instructions have been issued (*Direction du Service de Santé; Bureau du Matériel, Hôpitaux, Hygiène*; No. 9, 1911) regulating the diets in French military hospitals; these will take effect from January 1, 1912.

I.—Allowances for Dieting.

The expenditure for dieting will be in accordance with the scale fixed annually by the Minister for War.

The patients and officials doing duty in the hospitals to whom diets may be issued are classified into six groups, viz: superior officers, junior officers, *adjutants*, N.C.Os, (serjeants), corporals and private soldiers.

Diets are issued on four scales, viz.: Full diet (*grand régime*); small diet (*petit régime*); special diet (*régime spécial, petit régime détaillé*); plain milk or no diet (*régime des diètes*).

II.—Dieting of Patients.

(*a*) *Officers' Diets.*—*Grand régime*: This comprises for the evening and morning meal: Bread, oz. 10½, 7, 3½; thick soup 14 oz., or an *hors d'œuvre;* five dishes from the daily menu. *Petit régime*, morning and evening meal: Bread, oz. 5, 3½, 1½; thick soup 14 oz., or an *hors d'œuvre;* five dishes from the daily menu. Superior officers have the right to an extra dish at each meal. At réveillé all officers on large or small diet receive coffee or chocolate, or *soupe maigre* with 1½ oz. of bread. Officers on milk diet only receive 8 oz. of milk.

(*b*) *N.C.Os and Soldiers' Diet.*—*Grand régime*, morning and evening meal: Bread and soup, the same as for officers; a meat or fish course; a vegetable course from the daily menu. *Petit régime,* morning and evening meal: Bread and soup, the same as for officers; two dishes from the daily menu. Serjeants on full or small diet may receive dessert at each meal. *Adjutants* receive the same diets as N.C.Os with an extra dish from the officers' menu. The morning coffee, chocolate or milk is the same as for officers. The medical officer in charge of the case may countermand one or more dishes on any scale of diet.

(*c*) *Special Diet.*—This is the same for all classes of patients. The morning and evening meal will consist of two dishes from the daily menu. Coffee or milk is allowed at réveillé as in other scales of diet.

(*d*) *Régime des Diètes.*—This is the same for all classes of patients. There are two subdivisions: Milk diet (*diète lactée*) 35 oz. of milk morning and evening. No diet (*diète absolue*). Nil.

(*e*) *Diet Drinks.*—These are ordered without reference to the scale of diet prescribed. The medical officer in charge of the case may order the following diet drinks at each meal:—

	Officers	Adjutants	N.C.C.'s and men
Wine (oz.) ..	16	14	7
	8	8	3
Milk (oz.) .	16	16	16
	8	8	8
Beer or cider (oz.)	24	24	16
	—	—	8
Tea (fl oz.) ..	16	16	8
	8	8	—

III.—Attendants' Messing.

The sick attendants will usually mess together. The G.O.Cs in Algeria and Tunis may make other arrangements to suit local circumstances.

(*a*) *N.C.Os of Orderlies.*—These receive the same diet with wine as N.C.O. patients on full diet. Certain deductions for messing will be made from their pay. Married N.C.Os may be allowed to mess at home.

(*b*) *Corporals and Soldiers.* — All corporals and private soldiers employed in hospitals will mess together; they will receive a half ration of wine or beer without payment. Orderlies employed on specially trying duties may be allowed extra wine, tea, coffee or tonic drinks on the recommendation of the senior medical officer. Orderlies on night duty may be allowed a hot drink, e.g., black coffee.

(*c*) Orderlies' messing will be conducted as laid down for the troops.

IV.—Sisters.

Lady nurses and civilian cooks will receive the same diet as N.C.Os of orderlies. A light meal of cold meat or cheese, bread and wine is authorized for nurses on night duty.

V.—Menus common to Different Scales of Diet.

Daily menus for officers' or N.C.Os full or small diet will be prepared for a week at a time by the steward so as to obtain the greatest variation combined with economy. The proposed menus will be approved by the S.M.O. each Saturday morning and sent to M.Os in charge of wards, who will only order such dishes as are on the menu.

VI.—VEGETABLE BUTTER.

In the preparation of dishes for the full diet vegetable butter may be employed partly or wholly in place of butter or lard.

VII.—SCALE OF ARTICLES ALLOWED FOR DIETS.

In this scale practically every article of food is included, the permissible maximum quantity of each article being given for each class of patient and diet.

C. E. P.

Mexican Insurrection.—Notes on a visit by Major H. A. Arnold, N.G.Pa., to Juarez. (Extract from *The Military Surgeon*, vol. xxix., No. 1). "Arriving at El Paso at 7.30 a.m., May 12, immediately after breakfast, I went over the river to Juarez, where the fight took place on the 9th and 10th. An emergency hospital had been established in the 'Gran Restaurant Porfirio Diaz,' on the Avenida Lerdo. The glass sign at the curb as well as the plate glass front of the dining-room on the ground-floor had been shattered by numerous shots, for it was in this building that Garibaldi and his men located themselves to dislodge the federals from the customs house.

"Dr. Wilson of the insurrecto army was in charge here, assisted by Dr. Nelson, and a force of volunteer nurses from El Paso. Dr. Wilson showed me every courtesy and accompanied me through the entire building, every room of which was filled with wounded. The dining-room on the ground floor was used as a receiving ward and operating-room, and contained fifteen or eighteen wounded lying on cots, mattresses, bed springs, and the floor. All kinds of wounds were found here, many receiving their primary dressing. Between sixty and seventy were in this building. No one knew the exact number that had been treated the previous day when the hospital was opened.

"No attempt had been made to record names or nature of wounds, the entire time of the workers being taken up with dressings and operations. Those able to do so had walked off after treatment, the others had been distributed over the building, except some thirty odd who were removed to El Paso for treatment.

"From Dr. Wilson I learned that there was another emergency hospital where the federal wounded were to be found. He did not know its location exactly, hence I experienced considerable difficulty in finding it. The presence of a small hospital flag on the building and an insurrecto guard at the entrance served to indicate it after search. It was an old-time *adobe* stopping-place for man and beast, and bore the designation "Calle de la Paz." Here more than 100 wounded had been treated during the fight by the federal surgeon, Dr. Zuniga. The doctor was removed to El Paso the next day after the fight, suffering from fever, presumably typhoid.

"The building was indescribably filthy, and consisted of twenty odd rooms around a central courtyard, with no openings into them except a doorway in each. These constitute the only means of entrance or egress, also the only means of ventilating. Rooms back of these could only be reached by passing through those in front, and all rooms contained from four to six wounded, many with wounds yet undressed. Even abdominal wounds had no dressing applied. A half-dozen litters, with canvas absolutely saturated with blood, stood up against the wall in the court yard near a pile of uniforms that had been removed from the wounded.

"At the time of my visit neither doctor nor nurse was present, the only attendants being Mexican corps men, of whose proficiency I was unable to judge. Women camp followers were giving poor wretches coarse food absolutely unsuited to their condition. There being no cots or chairs in any room, the women sat on the floor, and the men had been lying on their hard beds for two days. The odour of blood-stained bandages, added to that of unwashed clothing and persons, to say nothing of the unsavoury, unswept rooms, was overpowering Flies and vermin abounded. The condition was inconceivable and indescribable.

"On visiting the hospital next morning, I found all the wounded being removed to a hospital further up the hillside, and this building being prepared for use as a fever hospital. Rooms were being swept and sprinkled with disinfectants in preparation for patients. In the uncleaned portion I found about thirty cases of fevers, among them two cases of smallpox, a number of cases of typhus, and the rest mostly typhoid.

"The typhus and smallpox cases were in rooms with other patients, and in their delirium called wildly to me in Mexican as I passed unescorted from room to room. The building had been loopholed for defence by the federals, and windows were shattered, walls in the rooms had the plaster knocked off, and casements were pierced by the bullets that passed through, and on into the courtyard. Eighty-one cases were now in the building, two had been discharged, and several brought in this morning.

"The building was a heaven compared with the hell from which the poor wretches had been brought. Cots were provided for all, they were being rid of their vermin, and a woman nurse was beginning the work of identification and recording the work being done.

"At the request of Dr. Miller, who was in charge, I washed up and assisted Drs. Miller and McCammant in their work. We left the building at 2 p.m., having just finished a hip-joint amputation in a case with a badly shattered femur. As might be expected, all classes of wounds were met with, including those of the chest, head and abdomen. Some patients received several wounds. One man brought in this morning had been lying since the fight in a comatose state from a bullet wound through the head.

"After leaving the hospital I procured a horse in El Paso and rode up the Rio Grande for five or six miles to a bridge over which I crossed under the scrutiny of both United States and insurrecto soldiers, went two miles from the river, and entered the arroya in which Madero was encamped prior to the Juarez fight. I made careful inspection of this wild, walled-in spot as I rode the five or six miles to the city, following the course taken by the insurrectos as they closed in on the town. The sanitary condition was good until I came to that portion of the camp from which they moved in their advance on the town. Here I found the remains of many half-consumed animals. They had been roasted whole, the meat cut off the carcass, and the rest left to pollute the air, as our nostrils testified.

"On the morning of the 13th I got mixed up in the crowd that surrounded Madero and Oroso, as they discussed the fate of Navarro, and saw the populace flee in terror as the leaders seemed about to resort to force of arms. At this time the Maderoists sent word over to Colonel Steever, U.S.A., to be prepared for serious trouble in Juarez.

"White cross nurses arrived from Mexico City on the 14th, and a car full of doctors and Red Cross nurses being due to arrive on the 15th, I felt that things would soon be on a conventional basis, hence turned my face northward, after an extremely pleasant and profitable tour of duty."

A Method for the Pure Cultivation of Pathogenic Treponema pallidum (Spirochæta pallida).—By H. Noguchi, *Journal of Experimental Medicine*, August, 1911.

In order to obtain materials for the cultures Noguchi has employed the spirochæte-containing testicular tissue of rabbits which had been inoculated with human syphilitic material. The rabbit's testicle when inoculated with human material rich in pallida swells gradually, and reaches a maximum in five to six weeks, when the spirochætes are found in enormous numbers. Any number of generations can be obtained by transmitting the strain from rabbit to rabbit. After several passages the spirochætes are almost free from "banal" bacteria.

As a culture medium Noguchi employs serum water (sheep, horse, or rabbit serum), to which a piece of sterile rabbit tissue is added. The rabbit tissues best adapted for the purpose are the kidney and testicle, heart muscle is also good, but liver is unsuitable. To obtain the first generation of pallida it is necessary to have a strict anaerobic condition; this is obtained by using hydrogen gas, a vacuum and pyrogallic acid in an anaerobic apparatus. The medium should be slightly alkaline. The presence of agar or gelatine interferes with the successful growth of the first generation of the spirochætes. Noguchi has now obtained six strains, but had great difficulty in obtaining the first generation of each culture, almost innumerable series of unsuccessful cultivations being carried out with each strain before one suddenly started to grow for the first time. Except in one instance the pallida grew with other bacteria; Noguchi, however, obtained pure cultures by allowing them to grow through a Berkefeld filter, the spirochætes were found to have passed through the filter after about the fifth day. Later, it was found that certain strains of pallida would grow together with the bacteria along the stab canal in a serum-agar tissue medium. The bacteria did not grow out into the surrounding medium, but the pallida grew out gradually, and was indicated by a light, almost transparent, zone of haziness. From this hazy colony pure cultures were obtained from four different impure strains. The pure culture of pallida grows well in serum-agar tissue, but even better in a serum-water tissue medium. No marked change in the culture medium is observed under anaerobic conditions. The growth does not extend very far from the bottom where the tissue lies. The pallida cannot be grown in any medium without the addition of tissue.

Up to the present Noguchi has only tested two strains for virulence. Both strains produced typical lesions in the testicle of a rabbit; the lesions became noticeable about two weeks after inoculation, and after three to five weeks the swollen testicle was found to contain an enormous number of actively motile spirochætes.

Report of Laboratory Work, Windward Islands, for Six Months ending 1910.– By Dr. L. Nicholls. It is probable that yaws are conveyed by means of a small fly, $\frac{1}{16}$ in. long, which swarms round the bare limbs of country labourers in search of a broken surface. Hence the author names it the "ulcer fly." It is an acalyptrate muscid. While the ordinary house-fly will not follow man or beast for more than half a mile, the ulcer fly has been observed to pursue a yaws patient eight miles by sea at St. Lucia.

The small fish, "millions," has been introduced, and has proved effective in destroying mosquito larvæ. Each female fish brings forth about twenty-five young at intervals of about a month, which arrive at maturity in four weeks. The fish are killed by rapid changes of temperature, by dragon-fly larvæ, mud-fish and crustaceans and by the direct rays of the sun. Notwithstanding this, they have multiplied greatly in 90 per cent of pools, swamps, streams and gutters where they have been placed.

It was noted that numerous larvæ of *Stegomyia fasciata* were often seen in screened tanks. The ova had been deposited in the gutter supplying the tanks. Some of the insects hatched out could pass through wire-netting 400 meshes to the square inch.

A vorticello was observed to attack the stegomyia larvæ and to cause their death. The life-history of this infusorian should be investigated with the object of stegomyia destruction.

Ankylostomiasis is one of the most important diseases in the islands. The common mode of infection is through the skin. The ova discharged on damp earth, are hatched rapidly into larvæ. A patient acquires one or two ankylostomes and then continuously re-infects himself by going to the same spot each day to defæcate. The soil of such places may swarm with larvæ. Drying and exposure to the sun kills both ova and larvæ. The author prefers beta-naphtol to thymol in the treatment of this disease.

The deadly snake, *Lachesis lanceolatus*, or fer-de-lance, was imported into St. Lucia, Martinique and Guadaloupe by the French in the eighteenth century to drive the aboriginal Caribs out of the bush. It multiplied so much that at one time it was necessary to fire the canefields before reaping. The mongoose was introduced and in a few years the number of snakes rapidly lessened. This animal with an abundant food-supply in the absence of enemies became very numerous. It completely destroyed all the snakes in the towns, villages and estates and also exterminated several birds which nest on the ground and greatly diminished the lizards. It warred against the rat, until circumvented by that rodent taking to the trees by day and hunting by night. The mongoose is a day-feeder. Latterly the mongoose have become fewer in number as their food-supply has become curtailed. The fer-de-lance has ceased to exist except in unexplored jungle where the mongoose does not live. The latter's habitat is short grassy scrub or bush.

Dr. L. Nicholls has done such excellent work in the short period covered by this report, that we look forward to further contributions from his laboratory. C. B.

Sand-fly Fever in the Austrian Army in 1909. By K. Franz and H. Kolar (Beihefte 2, *Archiv. für Schiffs und Tropenhygiene*, Band xiv, April, 1911).—Report on the 1909 epidemic of the short febrile ailment, which prevails every summer in the low-lying districts of Herzegovina and

Dalmatia on the Adriatic coast. After an incubation period of about five days, pyrexia suddenly occurs, accompanied with severe pain behind the eyes, in the back and legs, and sometimes along the course of nerves. The fever abates on the third day, as a general rule. Convalescence may be retarded by a feeling of lassitude and various by-symptoms. It is usual for immunity to be secured by one invasion. Relapses, however, are not infrequent. New arrivals are attacked, generally during their first summer. The local inhabitants are exempt.

Pick described the disease among the Austrian troops in 1886. Taussig suggested that the sand-fly, *Phlebotomus papatasii*, was the agent which conveyed the virus. Doerr, in the year 1908, showed experimentally that those flies which had drawn blood from a patient during the first twenty-four hours of his fever could transmit the disease by their bite a week later. The infecting material, which can pass through a porcelain filter, therefore undergoes some elaboration or growth in the body of the insect.

The outbreak in the summer of 1909 began towards the end of May. There were 550 cases of sand-fly fever among the garrison at Mostar; 109 in June; 238 in July; 197 in August, and 6 in September. The epidemic was milder and less extensive than in former years. This may have been due to the cool summer and to the abundant rain which repressed the nocturnal swarms of sand-flies. The attacks were mild at the beginning of the season. Cases of greater severity then occurred, though abortive attacks were still observed. The nervous type was next noted. In August gastro-intestinal symptoms were more prominent. There were 119 relapses at intervals from one to six weeks, that is, in 22 per cent of the seizures. Only ten soldiers suffered from second attacks. In 1908 the average duration of the pyrexia was sixty hours; in 1909 fifty hours. The temperature reached 103°-105° F. in the majority of instances, though it was below this in the shorter abortive forms. It was but seldom that the pyrexia continued for three and a half days. Four-day fevers were recorded twice only. If the temperature remained high for a longer period, it indicated some complication, such as an acute exacerbation of chronic influenza, which was common in the district, as in former years. Severe nervous symptoms were less marked than in 1908. Pains in the eyes, head, loins, hips, thighs and legs were often the cause of much distress. Giddiness and faintness were observed in some. Delirium was exceptional. Convulsions did not occur. Weakness, apathy, disinclination for exertion, mental or bodily, were frequent during convalescence. Pick's sign, the congestion of the conjunctiva, "pink-eye," was not so noticeable as in 1908. This was attributed to the cloudiness of the sky, high humidity of the air, and less dust. The catarrhal changes in the mucous membranes were not constant. Redness of the palate and fauces was seen in 60 per cent of the cases. A passing laryngitis was not uncommon, but bronchitis with abundant sputum was not recorded. Epistaxis was observed frequently, often at the onset, generally on the second or third day, and sometimes during convalescence. Disturbances of the digestive system are cardinal symptoms of sand-fly fever, and indeed may constitute the entire illness. In this respect there may be considerable variations in different epidemics, or during the course of an epidemic. In June and July, anorexia, nausea, vomiting, constipation and a coated tongue ushered in the attack. There was then but little tendency to diarrhœa either during or after the seizure.

In August, however, this symptom became so frequent that it changed the whole character of the outbreak. Sometimes the illness began with diarrhœa; but as a rule, when purging was noted, it happened on the third or fourth day. Tenesmus, with abundant slimy and blood-stained evacuations which suggested dysentery, lasted several days, and protracted the convalescence. Xeroform proved to be the best remedy. It is remarkable that these intestinal signs were often observed in people who presented no other symptoms of sand-fly fever. These patients became immune, though if a relapse took place it might assume the usual form of sand-fly fever. A slow pulse was an almost constant feature; noted often on the second day, but more frequently on the third or fourth, and it continued for a fortnight in some instances. A pulse-rate of 46 to 52, taken in the supine position, might persist for several days. Disordered action of the heart on slight exertion was a frequent, though not permanent, symptom. Blood-counts were made in seventy-eight cases. Leucopenia was always found. It began a few hours after the onset of the fever, in mild cases 4,000 to 5,000 were counted, though in severe cases the number was only 3,200 leucocytes. The diminution went on and reached its minimum on the third or fourth day—2,000 leucocytes per cubic millimetre was the lowest figure recorded. The rise took place slowly, and attained normal limits about the eighth day. Fluctuations were observed without obvious cause. Leucopenia recurred with a relapse, but it was less pronounced than during the primary attack. The decrease in leucocytes was not so marked in those cases which presented any form of rash during the febrile stage. After the disappearance of the exanthem their number lessened. If a secondary infection of the sand-fly bites took place, leucocytosis ensued.

On differential enumeration, it was found that the polynuclear leucocytes were diminished, both relatively and absolutely, during the pyrexia and for several days afterwards. The minimum ratio—50 per cent—was noted on the third day. The lymphocytes often showed a diminution at the beginning, and an increase up to twice their normal proportion later in the illness. The ratio was highest on the day following the most marked leucopenia. The large mononuclears and transitionals were relatively increased both during the pyrexia and convalescence. The eosinophiles were diminished or altogether wanting in the period of access, but later were increased relatively and absolutely. The red-blood corpuscles underwent no change in number or in hæmoglobin content.

The effects of a bite by a sand-fly vary greatly in different individuals. In its mildest form the sting gives rise to a red spot which disappears in an hour or so or may persist for a day or two. There may be no sign except some redness and itching. If of greater severity, the congested area may spread and become more livid in hue. The skin may not assume its normal aspect for several days. In most cases a few seconds after the bite an urticarial wheal arises and causes intense itching. This may subside in an hour or so and no trace of the sting be visible next day. The more usual result, however, is the formation of a very irritable papule, the size of a poppy seed. A small blister may develop over this, and may become surrounded with a zone of infiltration. The inevitable scratching ruptures the vesicle, and a dry crust takes its place, secondary infection ensues and pustules form which result in ulcers. The healing of these is often protracted and ends in brown pigmented scars. It is conceivable that this microbic infection may invade the whole body. One such case was met with, in which death occurred from sepsis. Staphylococci were isolated from the miliary abscesses found in the liver, kidneys and spleen. Pick, in the year 1885, recorded an example of such an ending.

No specific remedy for the malady was found, though many were tried. Since cases with diarrhœa appeared to suffer less from other symptoms, a laxative was given at the onset. Aspirin and pyramidon relieved the pains to some extent. Quinine was useless both therapeutically and prophylactically. Pilocarpin, atoxyl, thiarsol, enesol, and electrargol also were without benefit.

C. B.

Motor Transport Arrangements for the Army Medical Service (Germany). By Stabsarzt G. Schmidt (*Militär.-Wochenblatt.*, No. 86, 1911).—Three benzine motor ambulance cars for conveying sick have been in use in different garrisons since 1908; an electric ambulance car has recently been provided for Strassburg; the acquisition of other motor ambulance cars is in contemplation. The Central Committee of the Red Cross Society possessed thirteen motor ambulance cars on August 31, 1910; it was also making trials to see whether the horse-drawn ambulance wagon, Mark 95, could be attached as a trailer to motor lorries, and experimenting on the adaptation of passenger and goods motors for the transport of sick.

The regulations for the medical services in war provide for the following:—

The cavalry with army headquarters has a motor wagon for medical stores.

For the evacuation of sick from field hospitals to the railway, motor wagons provided by the Ministry of War, by Voluntary Aid Societies, or requisitioned locally, may be employed. In addition every advanced depot of medical stores has six motor ambulance wagons. These are either specially built cars or vehicles like motor omnibuses permanently adapted for the conveyance of sick.

Every advanced depot of medical stores has also six light goods motors, of a kind which can be temporarily adapted for the carriage of sick when not otherwise employed. These light motor wagons are also to be used for conveying medical stores from the advanced depots to the units at the front and on the Lines of Communication. The Voluntary Aid Societies are also encouraged to maintain a supply of motor wagons, with drivers, for the use of the medical services on the Lines of Communication.

C. E. P.

Correspondence.

DEFENCELESS CONDITION OF THE TERRITORIAL MEDICAL UNITS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I have read with interest Major Bigg's letter to the Journal on the above subject. Having recently taken part in the work of maintaining order during a succession of strikes in an area which is reputed to contain the worst "hooligan" element in the kingdom, I yet believe that it is neither necessary nor desirable to arm medical units of the Territorial Force for protecting wounded.

A state of war which would necessitate opening these units would admittedly dislocate traffic and trade to a far greater extent than any industrial war has so far done. But while strikes result in a host of self-respecting, but misguided, workmen combining and more or less actively assisting towards chaos and disorder, yet these same men (not to be confused with "hooligans") would be the first to realize that self-interest compelled them to the side of law and order, and to help to "keep things going" in a national emergency. A large number of workers in all sorts of positions in the industrial world would perforce be rendered idle in these circumstances, and it only requires slight acquaintance with them to know that they would eagerly volunteer to augment those bodies of emergency workers which are now in process of formation up and down the country, and that they would amply suffice to hammer out the "braves" of the hooligan horde. Pointless as attack on the wounded would be, the sense of self-preservation so engrafted in the true-born hooligan affords another reason for units so near rifle range as a field ambulance might be being left unmolested. The safety and needs of hospitals, civil and military, in or near large towns, would be among the first things to which public effort would be turned; and there would be no need for the medical personnel to engage in protecting either patients or supplies: so, at least, recent experience seems to prove. The one medical formation that might conceivably be placed in a position favourable for molestation is a Voluntary Aid Detachment functioning as a Clearing or Stationary Hospital; yet it is hard to believe that the inducements for attack by a mob would be sufficient. But, assuming for a moment that it is desirable to arm medical units of the Territorial Force against mobs, a carbine is not a good weapon for the purpose; a revolver is much to be preferred. It is, however, agreed that a side-arm of the kind carried by N.C.Os and men of the Medical Corps on the field hospital establishments of the German Army would prove of immense value to the personnel of field medical units, not as a weapon of defence, but to assist in improvisation.

I am, Sir, yours faithfully,

J. H. P. Graham,

Capt. R.A.M.C. (S.R.)

Staff Officer to A.M.O., W. Lancs. Div., T.F.

Liverpool,

October 9, 1911.

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Original Communications.

A CRITICAL REVIEW OF KALA AZAR AND TROPICAL SORE.[1]

BY LIEUTENANT-COLONEL SIR WILLIAM B. LEISHMAN, F.R.S.
Royal Army Medical Corps.

KNOWLEDGE of the group of diseases caused by parasites of the genus *Leishmania* has made great advances during the last three or four years, and, although finality is very far from having been attained in respect of any one of them, it may be useful to take stock of the present situation in order that attention may with greater profit be concentrated on the points which remain obscure. Such a critical summary may also be of service to those who are working on the subject, for the further reason that much if not most of the recent work on the subject is from the pens of investigators in other countries and is published in many journals and in many tongues, so that such workers, unless in close touch with a good library, may find great difficulty in obtaining the latest information. The literature has grown so rapidly of recent years that it is no easy task to keep touch with it, and in the present case no claim can be made that an exhaustive study of it has been accomplished, although the list of references may appear a lengthy one. It is felt, however, that any omissions in this connexion may be excused, since the Managing Committee of the Sleeping Sickness Bureau have decided to publish a Bulletin of the *Leishmania* diseases, on the lines of the *Bulletin of Sleeping Sickness*, and it is intended that the first number, which will appear before long, shall contain a complete bibliography up to the present date.

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It is only eight years since the discovery of the parasites, and up till that time few except tropical physicians were familiar with the names even of kala azar and of tropical sore, as distinct clinical entities. Once the parasites were recognized, however, knowledge of these diseases rapidly extended, and one of the practical results of this has been the realization that kala azar is by no means limited to Assam but is widespread throughout the globe, and, further, that the tropical sores described in so many countries under innumerable names are alike in respect of infection with parasites of the *Leishmania* group. What is still more of interest at the present moment is the fact that a form of kala azar has been found to be more or less frequent in countries bordering the Mediterranean, and the numerous cases which have been detected in Italy, Greece, Portugal, and elsewhere have proved that it can no longer be considered a disease of interest solely to those working in the tropics. Again, it has been abundantly shown that the terrible mortality of the Indian form of kala azar has its counterpart in that found in Africa and Europe, and humanity as well as science demands the strenuous investigation of the etiology, treatment, and prevention of this deadly scourge.

The unity of the various forms of tropical sore, though of scientific interest, is of less practical importance in view of the benign character of this affection; however, a form of ulceration which is usually altogether uninfluenced by treatment, and which only tends to heal spontaneously after many months, is of sufficient annoyance to justify almost equal zeal in investigations directed to its understanding and mastery.

In dealing with the subject, it is proposed to act on the assumption that the earlier work on these diseases is familiar to the reader; every text-book on tropical diseases gives full information on the subject which it appears needless to recapitulate. The article is, therefore, confined to a summary of the work which has appeared during the last four years and to comments upon some of this work, where comment falls within the competence of the writer.

It was originally intended to deal only with the systemic disease, kala azar, but, for many reasons, into which it is unnecessary to enter, it has been thought better to deal with the whole group, to which the somewhat cumbrous name of Leishmaniosis has been given—in conformity with trypanosomiasis, piroplasmosis, &c. At the outset, therefore, lies the question of how many forms of

Leishmania are recognizable and how far any given classification is tenable. It may be said at once that no classification can be accepted as final at the present moment. There are, however, two well separated diseases, the one a generalized systemic infection, almost invariably fatal, the other a localized cutaneous disease, invariably benign. These are respectively, kala azar, associated with the presence of *Leishmania donovani*, Laveran, and tropical sore, or *bouton d'Orient*—to give it only the names most generally employed—which is attributable to *Leishmania tropica*, Wright. These two diseases would appear to be as widely separated clinically as would be possible, and yet, even here, it has been suggested many times that we have to do with one and the same parasite as causative agent. The possibility of both groups of disease being due to one parasite cannot be said to be altogether excluded, although it is extremely improbable. The difficulty lies in the fact that the two parasites, *L. donovani* and *L. tropica*, are indistinguishable morphologically, and it is not at present possible to detect any constant and definite distinction either in their preflagellate or their developmental forms.

While this is the case with kala azar and tropical sore, it is naturally a still harder matter to decide in how far these two diseases ought themselves to be further subdivided, and it need only be added here that it is convenient to classify the group, for the purposes of this article, into three diseases, namely, Indian kala azar (*L. donovani*), infantile kala azar (*L. infantum*, Nicolle), and tropical sore (*L. tropica*, Wright).

I.—**Indian Kala Azar.** *L. donovani*, Laveran.

Although this disease was the first in which the Leishmania parasite was demonstrated (in 1903), and has been the subject of much careful research and observation, there has been little real advance in our knowledge within the last few years. As could be anticipated, diffusion of knowledge of the appearance of the parasite and of the methods necessary for its demonstration have led to the discovery of the disease in many parts of India and the surrounding countries where its existence had not been suspected. In the original focus of the disease, Assam, there has been a marked diminution of the annual number of deaths, which have fallen from 6,315 in 1900 to 1,703 in 1909, so there would appear to have been a gradual decline in the virulence of this prolonged epidemic. History tells of similar epidemics in various parts of

India which may very probably have been kala azar, and which similarly exhausted themselves and disappeared from the country or district. On the other hand, endemic foci have been found in numerous parts of India, and in other Asiatic countries lying to the west and the east of India, which furnish a formidable total of cases, and from which, it may be assumed, there is an ever-present danger of epidemic spread, similar to the Assam epidemic. In India itself cases have been reported which were apparently contracted in Nepal, and at Naini-Tal, while Prashad states that the disease is very common in Patna, ninety-four cases having been admitted to Bankipore General Hospital in one year. Incidentally, this last series serves to illustrate the difficulty of determining age and sex incidence in the disease; all of these ninety-four cases were males, but Prashad points out that this is solely due to the fact that children and female patients are rarely or never seen by a practitioner, owing to caste prejudices.

Precise figures as to the incidence of the disease in India as a whole are not forthcoming, and, even in those districts, such as Assam and Madras, where figures may be collected from the Sanitary Reports, it is only the cases which have come under the notice of medical practitioners able to recognize the disease which are recorded; there can be little doubt that these form but a fraction of the whole, the large majority being unrecognized, and that many fatal cases are still recorded as malaria, dysentery, &c.

The future will doubtless show improvement in this respect, and precise information will be available as to the infected areas and the true incidence of the disease.

As regards age incidence in India, the earlier views that the disease may attack any age, but shows a preference for young adult life, are supported by recent observations, but in this respect, and also in respect to sex incidence, there is, as has been said, little definite information, and any conclusions on these points must be accepted with reserve.

Both in Calcutta and in Patna the number of cases has been greater in Hindoos than in Mahommedans, but here again precise information is lacking, and all that can safely be said is that no race or creed appears to be exempt from attack. Europeans contract kala azar but rarely, but the enormous disproportion between them and the natives must be borne in mind; when they do contract it, they certainly exhibit no evidence of a higher immunity, since it is almost invariably fatal in such soldiers as have been invalided to England with the disease.

The distribution of the disease outside India itself at once brings one face to face with the problem of the identity or non-identity of the Indian disease with other forms of kala azar, but, assuming that all cases of the disease occurring in Asia are due to the same parasite, we do not find any great extension of the areas already known to be infected in Syria, Ceylon, Burmah, Indo-China, and China itself. Several endemic foci in China have, however, attracted attention—for instance, Peking, and the upper part of the Yangtse Valley; while cases have been found by Elders and others in the Dutch East Indies, both in natives and in temporary residents.

A notable feature of this side of the question has been that, once a case has been found in a new locality, and once the attention of the local practitioners has been drawn to its occurrence, the disease is soon found to be far from rare, and, further, one which has long been familiar both to the inhabitants and the medical men, although its true nature had not been suspected. This being so, it is highly probable that even now but a small number of the infected countries have been identified, and that some time must elapse before we shall be in a position to assign definite geographical boundaries to this form of kala azar.

Morphology.—Little falls to be added to the very full details of the morphological characters of *Leishmania donovani,* which were published by earlier workers, and have been abundantly confirmed since. The intra-cellular form, or, as it is called, the "Leishman-Donovan body," is remarkably constant in form and shape, and close examination of many specimens, derived from various countries and from different patients, has not disclosed any fresh features which might serve towards a differentiation of species. Fission forms have been encountered free in the blood, as well as in the cells of internal organs, but no confirmation has yet been recorded of Elders's observation in a case of a Madras woman, apparently infected in Sumatra, of a flagellated parasite in the peripheral blood. (In a later paper Elders describes another case in which the blood contained a new parasite akin to *Hæmoproteus.*) It is indeed remarkable that such have never been seen by any other observer, in view of the wide distribution of the parasites in the body and the very varying conditions, as regards environment, which they must from time to time encounter. Bousfield comments on the occurrence of parasites in the liver or spleen of cases in the Sudan in which the two chromatin masses appeared of nearly equal size, and suggests the possibility of these being sexual or conjugation forms; but this appears unlikely, and such parasites are not infrequently seen where the enlargement of the centrosome is obviously an early stage of simple fission of the parasite, while others are equally clearly degeneration stages.

Cultures and Cultural Forms.—The first successful cultural experiments of Rogers were soon repeated and confirmed by Chatterjee, by Leishman and Statham, and, since then, by many others, and successful development of the parasites into flagellate form is usually to be obtained by keeping citrated splenic blood under aerobic conditions at a temperature of 22° to 25° C. Success, however, is by no means invariable, even when the parasites are fairly abundant, and when the material is derived directly from a splenic or a hepatic puncture, and not obtained post mortem. Rogers's recommendation that the cultures should be acidified by the addition of a small quantity of citric acid has not been confirmed, and there does not appear to be any advantage in such a procedure; indeed, in a case in which the writer took the opportunity of testing this point, growth and development were more free in the cultures to which no citric acid had been added.

Great interest attaches to the capacity of the Indian strain of kala azar to develop in Novy-McNeal medium. Those who have attempted this in India have failed to get development into flagellate form, whereas, in the case of *Leishmania infantum*, rapid and abundant growth occurs in this medium and failure is usually recorded with citrated splenic blood. This cultural difference is usually held to be one of the more important points in support of the view that we ought to recognize the two as distinct species, and the difference appears to be constant, since it has been reported by numerous workers who have tried both cultural methods with the strain occurring in their own districts, Indian or Mediterranean, respectively. At the same time, the writer has succeeded on one occasion in securing flagellate development in Novy-McNeal medium of parasites derived from a spleen puncture of a soldier in the military hospital at Millbank who had contracted the disease in Bengal. As far as he knows, however, this is the only positive result, so it stands alone against many failures in most careful and capable hands. The point is one of considerable importance, and further work with simultaneous experiments with each strain is much wanted and will doubtless be forthcoming ere long.

The details of the development of the parasites in cultures and the structural characters of the flagellated organisms have formed the subject of close study by many workers, but no new facts of importance have been brought to light. The comparisons made between the flagellated forms of *L. donovani*, *L. infantum*, and *L. tropica* will be mentioned again, but it may be said here that differences of a specific character, if they exist at all, are very slight, and that the well-known polymorphism of these cultural forms adds greatly to the difficulty of determining their genuine character.

Animal Experiments.—So far there is no record of the successful transmission of Indian kala azar to an animal, and experiments with this strain at home have also failed. This failure is remarkable in view of the successful transmission of the Mediterranean form to dogs and monkeys, and also, though in very mild form, to rabbits, mice, and guinea-pigs. If further experiments, which are greatly to be desired, are found to have similar negative results, this would assuredly constitute a striking difference between the two, but the question cannot be said to have been settled, in view of the small number of the experiments recorded in India by Patton, Christophers, and Donovan. Nicolle's inoculation experiments of dogs and monkeys have been positive in the majority of instances, but, although Italian and French investigators have confirmed his results, they have not been able to secure infection in anything like the same proportion of animals. This would indicate that the conditions favouring successful experimental inoculation may show considerable variation, even when one is dealing with what appears to be the same strain of virus. This being so, it would be necessary to repeat Nicolle's experiments on a much larger scale in India than has been done, in different localities and with different species of dog and monkey, before we are able to accept as a fact that the Indian form of kala azar is not transmissible to these animals. Here, too, a ready solution of the problem would appear possible if only an Indian case was available for investigation in M. Nicolle's laboratory at Tunis, or one of his infantile patients could be transferred for a time to Madras or Calcutta.

Pathological Anatomy.—The numerous and exhaustive accounts of the distribution of the parasites in the body and the changes which they produce in the tissues, which are already on record leave little room for fresh observations, but Rogers has described an unusual form of cirrhosis of the liver which he believes to have been caused by *L. donovani*, which was present in abundance in the organ in the particular case, that of a Hindu. The cirrhosis was of a peculiar intra-lobular type and showed an even distribution throughout the organ, whose surface remained quite smooth. He has noted this form of cirrhosis to be commoner in Bengal than that due to malaria, and believes that it has often been wrongly attributed to the latter disease. A form of splenomegaly associated with hepatic cirrhosis has also been described by Day and Ferguson as endemic in Egypt and their account of the symptomatology corresponds very closely with that of Indian kala azar; they were, however, unable to detect any parasites in their cases.

Symptomatology.—The clinical signs of kala azar, as it is met with in India, are now fairly well known, and, taken together, give a picture which is very distinctive, so much so that in the majority of cases in which the disease is well established it is possible to be fairly confident of the diagnosis, even in the absence of a demonstration of the presence of the parasites. The character of the fever, the enlargement of the spleen and, in lesser degree, of the liver, the transitory œdemas and the leucopenia, together with other features which need not be recapitulated, go to make up a picture which, to say the least, is very suggestive. The writer has known of numerous cases diagnosed by brother officers on this congeries of symptoms alone which, on being subsequently submitted to the test of splenic or hepatic puncture, have been verified by the demonstration of the parasites, and this in some instances in localities where the existence of the disease was unsuspected.

The earlier descriptions of the symptomatology stand good at the present moment and have been abundantly verified. It may be added that the symptoms of the Mediterranean form, due to *L. infantum*, are almost identical, and the small points of difference which certain observers have noted will be commented on in dealing with this form.

Much of the literature which has appeared in recent years on the subject gives careful and accurate details of the symptomatology of the cases which came to the author's notice, but it is not possible to find in these descriptions any common symptom feature of new diagnostic importance. The character of the fever assumes a large part in these clinical accounts, and many of the lengthy charts of the cases are published *in extenso;* all serve to emphasize the fact of the very varied and irregular course which the temperature curve may assume. Cases could be divided into certain categories according to the main features of the temperature oscillations, but any description or analysis of these would occupy much space without serving any very useful purpose. The frequent occurrence of a double rise of temperature within the twenty-four hours, originally noted by Rogers, has, however, been confirmed in many cases, and Chatterjee states that cases of fever showing this peculiarity are not uncommon in Bengal; he has seen ten cases in the last five years in which the temperature took this form of a double quotidian type, there being two rises in twenty-four hours, each preceded by a definite rigor and separated by an interval of complete apyrexia. These cases he now believes to have been early cases of kala azar and, indeed, in one of them the parasites were subsequently demonstrated, while another occurred in a family in which there were present two undoubted cases of this disease.

Several authors mention the fact that the spleen is not invariably enlarged—Donovan says that this is the case in about 2 per cent of the Madras cases—and the rapid variations in the size of this organ, previously noted, appear a not uncommon feature. Elders, describing the case of a Javan at Sumatra, mentions a swelling of the lymphatic glands of the neck, axilla, and groin, but he does not appear to have attempted to prove the presence of the parasites by puncture of these glands, and the case may have been one of the new disease he thinks he has discovered.

The attainment of certainty of diagnosis still rests on the demonstration of the parasites, and in the enormous majority of the cases which have been recorded this has been accomplished by spleen puncture and the staining and identification of the parasites in the films made from the spleen juice. The question of spleen puncture as a diagnostic method is considered later; but reference must be made here to Donovan's experience. He states that he has now abandoned spleen puncture on account of its dangers, and relies on prolonged examination of films of the peripheral blood, which has given him 93·22 per cent of positive results. No other observer has had anything approaching this percentage of success, and the majority still rely upon spleen puncture. Hepatic puncture is generally recognized as being less satisfactory, since parasites may not be detected in the films although post-mortem examination at a later date may prove them to have been present in abundance in the liver.

Donovan states that he thinks he is able to detect a change of type in the disease, as he meets with it in Madras, and that it appears to be becoming somewhat milder than formerly, but he speaks guardedly and has not produced any evidence in support of this idea. From all one can gather from the reports of Indian kala azar in general, it appears that recovery is certainly possible, but that the death-rate is well over 80 per cent.

Treatment.—In so desperate and intractable a disease it is natural and proper that a great variety of drugs and methods of treatment should be employed, in the hope of avoiding or at least delaying the almost inevitable end. The recent remarkable successes of chemo-therapy encourage the hope that success may yet attend the search for a successful drug, but one must with regret conclude that the Indian form of the disease has not yet been conquered. It is sad to find so many articles concluding with a summary of the many methods and drugs employed and almost always ending with the statement that none of them appeared to have any pronounced beneficial effect. Much was hoped from atoxyl, especially in view of the recoveries which Sir P. Manson recorded as following on the prolonged administration of very small doses, but his success has not been repeated in India. Bramachari, however, says that atoxyl has given him good results when given in doses of 0·9 grm. every 7 to 10 days for a few months, but adds that he does not think that its beneficial effect is produced by any direct action on the parasites. Several other observers, however, have given extensive trials to this drug and abandoned it as useless. Arsenic, mercury, and antimony, in various forms, have given equally unsatisfactory results.

Fuchsin, of which Donovan formerly thought well, he now abandons, and a similar failure has resulted from his use of thymol. Ensor tried senega on some of his Sudan cases and was encouraged by his earliest attempts, one of his two first cases recovering after the development of a leucocytosis. He was led to this drug by its richness in saponin, which is said to be very destructive of protozoal life. His subsequent cases, however, have not borne out his hopes, and other officers who tried its effect in this country had no success.

The failure of quinine in the disease has come to be looked upon as a sign of almost diagnostic value, and recent reports are practically unanimous in recording its uselessness, when given by the methods customary in malarial infection. A hopeful note has, however, been struck lately by Muir, who has used it with a view not so much to any specific action on the parasites as to the production of serous effusion and subsequent leucocytosis by means of hypodermic injection. By his method he claims to have reduced the mortality of the disease in a striking manner, especially in cases in which infection was comparatively recent. Since his experience of the disease is exceptionally large—he states that as many as 700 to 800 cases may be seen in a single week at Kalna—

his method may be given in more detail. He employs a solution of the following formula: Quin. sulphat., 32 gr.; acid sulphur. dil., 1 drm.; aqua destill., 4 drm. From 20 to 90 ♏ of this solution are injected into the *latissimus dorsi* in adults or into the gluteal region in children. It causes great pain, but this he modifies by a previous injection of cocaine, the needle being left *in situ* for two minutes and then the quinine solution injected through it. An effusion of lymph occurs and this is followed by a polynuclear leucocytosis, a fall in the temperature and a diminution in the size of the spleen. He repeats the injections as soon as or before the swelling has subsided.

Muir notes, as have others, that cancrum oris has sometimes been followed by recovery, although it is one of the common terminal affections of the disease, and he has seen other cases which suggest that any process in the body, whether septic or not, which tends to produce effusion of lymph and a leucocytosis tends to check kala azar. In this connexion he mentions two interesting observations of indigenous native treatment of the disease. In Syria, where it is common, the natives often employ a dirty seton, inserted over the region of the spleen, and in Bengal there is a custom of producing an ulcer of the skin by rubbing into a scarified surface a powder obtained by incinerating the core of the jack-fruit.

Prashad records three recoveries after subcutaneous injection of phagocytin, but has had no success from soamin or from the hypodermic injection of the hydrochlorate of quinine.

In considering the results of recent treatment of the Indian form of the disease, it is very noticeable that in many cases in which improvement or recovery has followed some line of treatment, a polynuclear leucocytosis has been one of the features, and a not infrequent portion of a successful treatment has been the production of severe or prolonged counter-irritation, usually over the region of the spleen. As regards the latter, the only case of recovery which the writer has seen in a soldier was in a man who suffered from a severe and intractable X-ray burn over the liver. Counter-irritation and the production of a leucocytosis would appear, then, to be desirable aims in any future system of treatment.

Etiology.—It is regrettable that we still lack precise knowledge of the mode of infection in the Indian form of the disease. The rapid advances in connexion with the etiology of the Mediterranean form gave reason to hope that similar progress, confirmatory or other, would be made in India, but this has unfortunately not been the case.

Two views have been advanced as to the transmitting agent of the parasite, that of Rogers, who believes that the common bed-bug of India, *Cimex rotundatus*, Signoret, is the agent concerned, and that of Donovan, who suggests a large, plant-feeding bug, which is an occasional blood-sucker, *Conorrhinus rubrofasciatus*, de Geer. Rogers's views, which were chiefly founded on general epidemiological grounds, have received some support from Patton and Christophers, and each of these, especially the former, has endeavoured by careful feeding experiments to solve the problem. The principal difficulties in connexion with satisfactory feeding experiments, which are essential for definite proof of connexion between a suspected insect and a disease, are, first, that so few cases are encountered in which parasites are present in the peripheral blood of the patient in numbers great enough to make infection of the insect probable or possible; second, that in India no animal has been found which is susceptible to the disease. A further difficulty, and one which bulks largely in all such experimental problems, is the need for prolonged and systematic study of the natural parasites of the suspected insect or acarian. This naturally adds greatly to the difficulty of determining whether any parasites found in a bug, or *Conorrhinus*, which has been allowed to feed on a case of kala azar, are developmental forms of *Leishmania*, or flagellates of another kind.

Patton, however, whose careful studies of the normal parasites of bugs and other animals have rendered him especially well-equipped for such work, is strongly of the opinion that the bed-bug is the true intermediate host and transmitting agent, and in some of his experiments he was convinced that the parasites ingested from the patient's blood had undergone development into flagellated form. These results, however, were only obtained in a few instances, and the confirmation which is desirable in such experiments has not yet been recorded. On the other hand, Donovan, who attempted to confirm Rogers's and Christophers's work by feeding bugs on some of his cases at Madras, failed to obtain evidence in support of the theory of bug transmission. He also made a search in the gut contents of a large number of bugs, collected either in the hospital itself or in the part of Madras City in which the disease is endemic, without encountering any parasites which he could identify as *Leishmania*, either in its flagellate or non-flagellate form.

Against the bug theory is the observation which has been put on record by several observers that careful search and inquiry led them to believe that they had been able to exclude the possibility of bug infection in particular cases, but negative evidence of this character is naturally of minor value. Malarial history is full of instances in which the presence of *Anopheles* was apparently excluded in a district in which subsequent search was successful.

The *Conorrhinus* theory of Donovan rests on somewhat slender evidence, and, as far as the writer is aware, has not been made the subject of experiment by any other worker.

Since Nicolle and his colleagues have shown that *L. infantum* is a natural disease of dogs, and Pianese and others have practically proved the transmission of this disease from dog to dog and from dog to man by the agency of the dog-flea, *Pulex serraticeps*, it is in this direction that further and more extended investigation in India is so urgently called for. Up to the present, the researches of Patton, Donovan, and Christophers have failed to disclose a single instance of Leishmaniosis in a dog, and they have also failed to transmit the disease to these animals by injection of the parasites into the liver substance and the peritoneal cavity, following the technique which is successful in Nicolle's hands. All of these observers incline to the belief that the Indian form of kala azar is *not* a natural disease of the dog, and also that the dog is not susceptible to it. Patton further states that the epidemiological evidence in Madras is not favourable to this theory of dog infection and flea transmission.

Without reflecting in the slightest on the skill and competence of these observers, it appears to the writer that the negative results which they have obtained are insufficient to justify such conclusions. A careful study of the work which has been done in connexion with the etiology of the Mediterranean disease, which is being added to almost daily, shows the necessity of widespread search for proof of the existence of spontaneous infection in dogs, and several instances are on record where an exhaustive search of the dog population has been negative in the first instance and positive later. The disease among dogs appears to have its well-defined endemic areas, just as in the case of the human disease, and further, as Nicolle has suggested, seasonal influences may play no inconsiderable part. It may well be, therefore, that further search in other districts, or perhaps even in the same district, may yet disclose the existence of natural infection in Indian dogs. The failure of artificial infection, if confirmed by further experiment, would certainly be a strong proof that we have to deal with two species of *Leishmania,* causative of generalized infection, but the number and duration of those recorded by Indian observers is insufficient to permit of definite conclusions on this point, especially in view of the varying degree of susceptibility which has been shown to be possessed by those animals in, for instance, Tunis and Sicily.

The future will doubtless soon afford a solution of this important question, and the sooner the better, since it is obvious that, until clear evidence of the mode of infection is forthcoming, little can be done in the way of effective prevention.

(*To be continued.*)

A COMPARISON BETWEEN SYPHILIS RELAPSES UNDER MERCURIAL AND SALVARSAN TREATMENT RESPECTIVELY.

By Major L. W. HARRISON.
Royal Army Medical Corps.

In untreated cases of syphilis and those under mercurial treatment, the character of the symptoms is generally in accordance with the time which has elapsed since the primary sore made its first appearance. The intervals between the successive stages may be lengthened by mercurial treatment, but, speaking generally, early symptoms are not repeated. Thus primary sores do not recur two months or longer after they have healed, nor do early secondary rashes return in any high proportion three months or longer after they have disappeared.

With salvarsan-treated cases, the experience at the Military Hospital, Rochester Row, has been different from this. Of the cases suffering from primary sore only, which were treated with salvarsan, active signs returned in five after intervals of two and a half to ten and a half months, and in four of these the only sign of the relapse was the chancre, which recurred two and a half, two and a half, ten and a half, and three and a half months respectively after first healing. Out of eleven cases which suffered from early secondary rash when they first came under treatment and subsequently relapsed, in eight the same rash returned, twelve, four, three, ten, seven, seven, four, and seven months respectively after it had first disappeared. One of these cases was instructive in this respect: he was first treated with salvarsan for roseola, sore throat, and synovitis, all of which rapidly disappeared after the injection. Subsequently he suffered from two relapses, which occurred three and six months respectively after the first injection, and on each of these occasions all the above symptoms returned.

The sequence of events in syphilis which has been roughly divided into primary, secondary, and tertiary syphilis, and parasyphilis, is capable of two explanations: (1) That the *Spirochæta pallida* undergoes a series of changes when resident in the tissues, and that in each of these successive phases the symptoms to which it can give rise are peculiar to the stage at which it has arrived. (2) That it is the tissues which change, so that the longer the spirochæte acts on them, the more the lesions which result from any increased activity of this parasite approach, first, the characters peculiar to the so-called secondary, and then those of the tertiary stage.

The first explanation would be difficult to prove, and against it is the fact that infection with spirochætes derived from a secondary or tertiary lesion results in a primary sore. In favour of the second explanation is the well-known fact that in the majority of cases of syphilis, whether untreated or treated with mercury, re-inoculation does not result in the production of a second chancre. As Queyrat showed, this refractory behaviour of the skin and mucous membranes to infection from without is gradually developed during the ten days which succeed the appearance of the primary sore; as the end of this period approaches the sore resulting from re-inoculation becomes more and more evanescent till, finally, no chancre follows. Finger and Landsteiner succeeded in producing skin lesions in such cases by inserting large amounts of syphilitic virus in pockets under the epidermis; these were not chancres, however, but simulated the lesions from which the patient was suffering at the time. Thus in the secondary stage a papule followed the inoculation, while in patients suffering from gummata or ulcerating syphilides identical lesions formed at the sites of inoculation. That these were due to the newly introduced spirochætes and not to those already infecting the patients, was shown by the fact that if the former were previously killed the result of the inoculation was negative.

The evidence is, therefore, strongly in favour of the theory that it is the length of time during which the spirochætes have acted on the tissues which determines the characters of the successive manifestations of syphilis.

If we accept this view, the nature of the above-mentioned relapses in cases treated with salvarsan only indicates that from the date of the last injection till shortly before the appearance of the clinical symptoms the spirochætes had not been active in the majority of cases. This is supported by the fact that in most of these the Wassermann reaction had returned to positive only three or four weeks before clinical symptoms returned, and it shows that, unlike the case with the great majority of patients who are treated with mercury, the latency was not apparent only, but real. It remains to be seen whether cases which relapse clinically many months after the Wassermann reaction has returned to positive will have symptoms of a later type than those for which they were first treated: since the Wassermann reaction, as ordinarily elicited, is not an index of immunity, but closely accords with the activity of the parasites, it is to be expected that they will.

Further evidence of the superiority of salvarsan over mercury in its action on the *S. pallida* is afforded by the cases of reinfection which have been recorded; one undoubted case of this kind has occurred at Rochester Row.

From the above it would appear:—

(1) That salvarsan has a more intensely specific action than mercury.

(2) That, even if a relapse does occur, as the patient's tissues have been free from the action of the spirochætes for the greater part of the interval, other things being equal, his health should be better than that of the patient who is treated with mercury only.

(3) That, if subsequent events justify the hope that a salvarsan-resistant strain of *S. pallida* is not produced by repeated injections, it should be possible to prevent patients who are still in the very early stages of syphilis from developing symptoms of a later type. To accomplish this, however, it would be necessary to watch each patient carefully, especially with regard to his Wassermann reaction, and to repeat the treatment on the least indication of the latter returning to positive.

A PERSONAL EXPERIENCE OF LIFE IN A SANATORIUM.

By a Patient.

Before giving any particulars of the general regimen of the sanatorium and the lessons I learnt therein, I should, perhaps, give a précis of my own case.

I was serving at a hill station in India during the hot weather of 1910, and the first thing that struck me was the fact that I did not get my "hill wind," but continued to suffer from slight breathlessness on the least physical exertion. This breathlessness is often experienced on first going to the hills, and is due, I take it, to the sudden change to the rarefied atmosphere of an elevation of from 7,000 to 8,000 ft., but it usually disappears in a few days. I have noticed that ponies and dogs suffer in the same way. During June, July, and August, I had occasional attacks of slight pyrexia in the evenings, slight cough in the mornings, and a general feeling of malaise, but did not feel sufficiently ill to "go sick." During the last week in August I caught a chill, the cough became very troublesome, and I had some pyrexia most evenings, the temperature (in the mouth) never going above 100°, the malaise increased, and I began to suffer somewhat from insomnia. The sputum was examined on September 20, and "tubercle bacilli were found fairly numerous in some of the fields." The physical signs were: slight flattening of the chest at the left apex and impaired movement to a slight extent. On percussion the note was not quite so good over an area of about the size of a five-shilling piece just below the clavicle. The expiratory murmur over this area was prolonged, and indefinite moist sounds could be heard, which, however, disappeared on coughing. I returned to the plains during the first week in October, and on the sputum being again examined, tubercle bacilli were again found to be present. As my general condition was gradually becoming worse, I was permitted to avail myself of eight months "ordinary" leave, and sailed from Bombay on November 19, landing at Tilbury on December 10. My weight the day before sailing was 9 st. 12 lb., my usual Indian weight being about 10 st. 6 lb. On arrival I saw Dr. L., of Portland Place, who confirmed the diagnosis, and recommended treatment in a sanatorium at home, much to my relief, for I had been dreading having to go to one abroad. Early in January I had a slight attack of pleurisy without effusion on the left side, but this only inconvenienced me for a few days. I was admitted into the sanatorium on January 16, having been unable to arrange to go in sooner. My condition on admission was much as above, there were occasional crepitations at the left apex with slight retraction and impaired movement. There was also slight friction over the left infra-mammary region, the remains of the pleurisy mentioned above; tubercle bacilli were again found to be present in the sputum.

View of Châlet.

Condition on February 17. Some moist sounds at left apex on deep inspiration, but only after coughing. No friction in left infra-mammary region. Felt very fit.

Condition on March 19. No adventitious sounds to be heard. General health very good.

The sputum was examined on March 20, and again on April 11, and on neither occasion were tubercle bacilli detected.

I left the sanatorium on April 14, feeling a new man. I have, however, continued the injections of tuberculin (Koch) (bacillary emulsion, containing 5 mg. bacillary substance to 1 c.c.) every few days, with the exception of one month when I was away in the Midlands, up to the present time, as a precautionary measure, and I am advised to continue them for a few months, which advice, I need hardly say, I mean to follow.

Full particulars regarding dosage of tuberculin, exercise, temperature, and weight will be found in the temperature chart attached.

To proceed to the more special experiences and lessons learnt:—

To begin with, I am quite convinced in my own mind that, with the best will in the world, I should not have been able to carry out the treatment in any way satisfactorily in a private house.

Apart from special treatment such as injections of tuberculin, or specially prepared vaccines in cases of mixed infections, expectorants, *et hoc genus omne*, the main object of the sanatorium regimen is to systematize one's mode of life, to attain which, fresh air, diet, rest, exercise, care of the teeth, care of the skin, clothing and bedding, instruction in avoiding spreading infection and in becoming re-infected, and care of the voice, must be considered the most important factors.

I will now touch on these points seriatim.

Fresh Air.—Having newly arrived home from India, I confess that I was in a state of considerable trepidation regarding the cold inseparable from "fresh air" during the three coldest months of an English winter, but I may say at once that I got quite used to it in a few days. There were no less than sixteen windows in my bedroom, but I quickly learnt from experience that with these, or the majority of them at any rate, wide open, the cold was not only endurable but almost pleasant, after the first few days, but I could not have borne, with any degree of comfort, one window partly open (as so often obtains in private life), on account of the difficulty of avoiding draughts. I had always been exceedingly prone to catch cold, usually culminating in slight bronchial catarrh, but during the whole of my stay in the sanatorium I never had anything approaching a cold.

Fresh air may be looked upon as the most important element in the cure, and the main object to be arrived at is to ensure that expired air shall never be rebreathed. This is, of course, necessary to maintain perfect health in any individual, but is a *sine qua non* in one suffering from tubercle of the lung, for such a one may be regarded as in a condition of chronic poisoning, partly on account of the lungs, in their damaged state, being unable to excrete the normal waste products with their normal facility, and partly on account of the toxic products being manufactured in the lungs by the tubercle bacilli or other pathogenic organisms. While we were warned to avoid draughts, we were advised to accustom ourselves to a gentle play of air on the face day and night. The necessity for invariably breathing through the nose was also, of course, strongly impressed upon us. We were instructed in the necessity for cultivating an erect carriage and avoiding slouching, and also that we should change the "residual" air in the lungs by a few full deep inspirations a few times in the day.

Diet.—I found the diet plain, exceedingly wholesome and nutritious, everything the very best of its kind, and cooked and served in a most appetizing and tempting manner. No attempt was made at indiscriminate "stuffing" regardless of appetite and digestive capabilities, though one has heard stories of sanatoria where patients are obliged to consume a fixed amount of food at each meal, even though the attempt to swallow it may result in vomiting, and regardless of the fact that if they succeed in swallowing it, an attack of acute dyspepsia will probably supervene. We were *encouraged*, in every possible way, to eat, but there was no forcing; a common-sense view, in my opinion. The necessity for thorough mastication was also impressed upon us.

There were separate tables in the dining-room, each seating four to six, and every endeavour was made to seat congenial spirits (of either sex) at the same table, the importance of cheerfulness, good temper, and laughter at meals being fully recognized. Butter and cream were supplied practically *ad lib.*, and we were encouraged to drink as much milk as we could digest, this being obtainable at any hour of the day or night, and hot for those who so preferred it. This was the only beverage supplied at lunch and dinner, alcohol in any form being only given in exceptional cases and under doctor's orders, of course. I can honestly say that I never wish to be better fed than I was in this sanatorium. The physician in charge invariably had his meals with us, going the round of the tables in rotation, a most important matter, as not only was he thereby enabled to keep an eye on the cooking and service, but also to see for himself in a practical way how each patient was "doing himself."

The necessity for the care of the teeth and for obtaining advice from a dental surgeon in cases requiring it, was most carefully impressed upon us.

Rest and Exercise.—The careful regulation of the amount and nature of rest and exercise was one of the most important elements in the sanatorium régime.

To take rest first: The necessity for periods of rest during the day is obvious, for the recuperative and healing power of the body is most active during rest and sleep. After each meal a full half hour's rest was enjoined, and before lunch and dinner we were expected to do three quarters of an hour in a long chair or on the flat of the back. The rest after a meal seemed natural, for one does not feel inclined to undertake any real mental or physical exertion on a full stomach. The object of the rest before a meal was, however, not so apparent at first, but I had not been many days an inmate before I realized the enormous benefit resulting therefrom, in the way of increased appetite and digestive capabilities. During the early part of my stay I have occasionally begun a before-meal rest with a feeling of indifference almost as to whether or not I had the coming meal, and on its completion have found myself as hungry as the proverbial hunter, and, what is more important, able to quickly and easily digest what I ate. I developed an enormous appetite after the first few days, larger even than in my schoolboy days, which is saying a good deal! Personally speaking, I considered the rest before meals secondary in importance only to fresh air. We were not encouraged to do any strenuous reading or writing during these "rests," and we usually read a newspaper, novel, magazine, or other light literature, or wrote ordinary letters, but where necessary, even these occupations were discouraged and the rest was a real *dolce far niente.*

I was permitted exercise from the first (my case being practically non-febrile), the nature and amount of which is shown in the temperature chart.

Exercise adapted to the capabilities of each case is of the utmost value, and its exact nature and amount was prescribed for each patient each morning by the physician in charge, though here again no one was treated as a child (as one hears is the case in some sanatoria), for if we were feeling particularly fit—I am speaking, of course, of cases well on the high road to recovery—no exception was taken to our doing a little more than the prescribed amount; on the other hand, if we felt disinclined to do the full amount, we might cut it short a little without incurring a "telling off," but in every case the amount and nature of the exercise was entered on the chart.

The necessity for avoiding excitement and hurry was strongly impressed upon all, and we were advised that it was better to get wet if caught in the rain, or be late for a rest, than hurry home or run to catch a train or tram.

The usual form of exercise was, of course, walking, though those who were fit and inclined for it, could do an equivalent amount of gardening.

There was also the exercise involved in playing the various games, of which more anon.

The care of the skin resolved itself into advice as to suitable clothing, bathing, avoidance of excessive perspiration, &c.

I need hardly say that we did not dress for dinner, "boiled" shirts being strictly tabooed

Clothing and Bedding.—We were advised to wear just sufficient clothing to keep the body comfortably warm by day and night, and loose warm woollen underclothing was recommended. Needless to say, if we got "hot" at exercise, we were advised to have a rub down and change into dry underclothing immediately on reaching home.

Great care was taken to avoid, as far as possible, cold hands and feet, by the use of hot water bottles and warm woollen or lined gloves. In bed I used "Jaeger" sleeping socks, and found them preferable to a hot-water bottle, as they kept my feet beautifully warm till morning, whereas a hot-water bottle ceases to be hot, or even warm, after a few hours in cold weather, though, of course, I could, by ringing for the night nurse, have the bottle refilled as often as I wanted, but those of us who were not seriously ill were, naturally, averse to adding to the work of the nursing staff unnecessarily.

Instruction in how to avoid spreading infection and becoming re-infected was given to all; when the first of these is strictly attended to, there is, of course, no danger whatever as regards the second, so far as the sanatorium is concerned. I had to provide myself with a sputum flask for use when not in my bedroom, and the sputum in this and also that in the sputum cup in the bedroom was burned each morning, and both sputum flask and cup were most carefully disinfected. The sputum cup always contained some antiseptic, a solution of Kerol, I believe. In addition, cheap cotton pocket-handkerchiefs, which were carried in a pocket lined with impervious material, and Japanese paper serviettes were *de rigueur*, and both were burned after use. I need hardly say that anyone seen spitting anywhere but into his sputum flask or cup was severely "jumped on" by the other patients, as well as by the sanatorium authorities. Each bedroom was most thoroughly disinfected directly a patient was discharged. We were also taught to avoid coughing more than was absolutely necessary.

Care of the Voice.—We were warned against shouting or straining the voice, and even singing was only permitted under medical advice. When the larynx was affected, patients were taught to speak in whispers, or, if necessary, to observe absolute silence. In this connexion, it will not be out of place to say a word about the use of tobacco. Being an inveterate though moderate smoker, I made inquiries from the consultant in London regarding the use of tobacco in my then state of health, and was informed that smoking in moderation would do me no harm, *provided it did not make me cough*. This opinion I found endorsed by the physician in charge of the sanatorium, though he himself was a non-smoker. I need not say that smoking in the building was forbidden, for obvious reasons. Being allowed to smoke naturally made an enormous difference to one's peace of mind and comfort, and in my own case, to my health, as I have always found it a valuable aid to digestion.

Amusements.—Croquet was played (all the year round) by those who were fit for it and cared to do so. There was also a three-quarter size billiard table in an outside billiard-room. This was a perfect godsend to us, though naturally the cushions were not very lively on account of the windows being perpetually open. We also used this room as a smoking-room. Both games were played only with the permission and under the supervision of the physician in charge. There was also usually a bridge table going after dinner. Concerts were of frequent occurrence, the performers being drawn from amongst the patients, supplemented by outside amateur talent, and last, but by no means least, the doctor and lady housekeeper (who, by the way, sang beautifully).

In every possible way a spirit of cheerfulness, the will to get well, the avoidance of anything morbid and depressing, *e.g.*, discussing one's symptoms, and what I may term "esprit de sanatorium," were inculcated, and we should indeed have been of a "dour" disposition had we not felt bright and cheerful, considering all that was done to make us so. Personally I had a far happier time than I could have believed possible in such a place. It is obvious that it is of as little use to go into a sanatorium unless one is prepared to abide rigidly by the doctor's orders as it would be to go to a "crammer" and expect him to pass one without doing one's work. I suspect that many cases of so-called failure of sanatorium treatment in apparently suitable cases can often be attributed to non-compliance with the physician's orders on the part of the patients, possibly because the reasons for the necessity of such orders are not realized by patients, but "Theirs not to reason why, Theirs but to do (or) die" (or, at any rate, leave without having derived any material benefit from their sojourn !)

The daily routine was as follows :—

6.15 a.m. A small tumbler of milk for those desiring it. (I always had a cup of tea instead.)

7 a.m. Take temperature.

8.30 a.m. Breakfast, rest until 9.30 a.m.

9.30 a.m. See the doctor.

10 a.m. Hot or cold milk for those desiring it; after this one took one's morning exercise, and took the temperature immediately on returning therefrom

12.30—1.15 p.m. Rest.

1 p.m. Take temperature (for those not on exercise).

1.30 p.m. Lunch, rest until 2.30 p.m.

4 p.m. Tea.

5.30—6.15 p.m. Rest.

6 p.m. Take temperature.

6.30 p.m. Dinner, rest until 7.30 p.m.

9 p.m. Retire to bedrooms and take temperature. Milk for those desiring it.

9.30 p.m. Lights out.

The above was subject to such modifications as might be required in individual cases.

The physician in charge of course paid an afternoon and evening visit to bad bed cases.

The weight was taken each Monday morning directly after seeing the doctor, and great was the competition to put on the greatest increase.

Temperature.—The temperature was invariably taken per rectum, and I learnt the unreliability of taking it in the mouth, during the cold weather at any rate, for I made a series of experiments to ascertain the average difference between the mouth and rectal temperature; the maximum difference I found was no less than 3·2° and the minimum 0·6°, with an average of about 1°, the mouth temperature being, of course, invariably the lower, due, no doubt, to the cooling effect on the mucous membrane of the inspired air, which in this country, at any rate, is always considerably below the body temperature.

The after-exercise temperature was considered normal if it did not exceed 100·4° F. (after, say, an hour's smart walking), and provided it fell to normal within half an hour of absolute rest in the recumbent position. This normal rise of temperature (in the rectum) after exercise was, I confess, something quite new to me, and I was somewhat alarmed on taking my temperature after my first walk, having visions of my exercise being cut down to vanishing point, and possibly a week or so in bed! I am credibly informed that the temperature of football players taken in the rectum after a strenuous game will sometimes rise to 103° F., or even a little higher, but that it falls to normal after half an hour's absolute rest in the recumbent position. I discovered that, in my own case, at any rate, the equilibrium of the thermo-tactic centre is nearly as unstable and easily affected by outside influences as is the vasomotor centre. For the first few days I used to pass my before-dinner rest sitting at a table playing that, to me, most fascinating of patience games called "Miss Milligan" or writing ordinary letters, and was astonished to find my temperature invariably a little above normal, though neither occupation entailed, of course, the expenditure of more than a slight amount of physical and mental exertion. I also found that any mental excitement, such as reading an exciting magazine story or novel, or even any real conscious cerebration without any physical exertion whatever (not even that entailed by holding a light magazine), such as endeavouring to repeat to myself things previously memorized, resulted in a similar slight rise of temperature—aye, and even unconscious cerebration also, for the morning temperature was always a little raised after a dream, especially if in the dream I had performed any action requiring any marked physical or mental effort: for instance, I once dreamt that I initiated a candidate into the "mysteries and privileges of freemasonry," going through the whole ceremony from beginning to end, a process which, in actual practice, takes about three-quarters of an hour, and on waking found my temperature distinctly above my average morning (waking) temperature. I found the evening (6 o'clock) temperature the most difficult of control, and I made it a practice, after a little experience, on the first and second evenings after an injection of tuberculin, and whenever I was, for any reason, not feeling quite "up to par," to do my before-dinner rest on the flat of my back with my eyes closed, not moving a muscle, and with my mind as complete a blank as possible, more or less in the state of the chronic loafer suffering from a more than usually severe attack of "ergophobia," who, when asked how he passed the time, replied: "Sometimes I sits and thinks, but most times I just sits"!

I quickly got to know the "exercise-equivalent," as shown by the temperature, of the various games, &c. For instance, a game of 100 up at billiards raised the temperature about as much as walking a mile at a fair pace; a hot bath raised it a little more. We had several billiard handicaps during my stay, and one game under these conditions, with the added excitement, sent the temperature up a little higher than an ordinary game.

I need hardly say that on leaving the sanatorium, each patient, however well he might be, had strongly impressed upon him the necessity for continuing, as far as possible, the mode of life he had been taught there.

This leads me to offer my only criticism of the sanatorium regimen. I cannot help thinking that it is a mistake to continue to apply all the very excellent sanatorium rules and regulations, which are undoubtedly very necessary for the common and individual good in the early days of their stay, to the very last day patients remain in the establishment. It is practically impossible to carry out these in their entirety in one's ordinary walk in life, however anxious one may be to do so; and I am of the opinion that a gradual and increasing relaxation of the least important of them would be advantageous, so as to let each patient down gently, so to speak, to the low hygienic level (compared with the régime of a sanatorium) of everyday life.

As I had still some three months of leave remaining when I left, the change in my own case was not very marked, for I was my own master and could therefore continue "rest" hours, &c., &c.; but what of those who leave the sanatorium to recommence, say, hard office work, with long office hours in perhaps an ill-ventilated room, and where, perchance, the other clerks would object to too much of the "fresh air" theory in actual practice.

It is hardly within the scope of this article to deal with the vexed question of the value of tuberculin. This much, however, I will say, that I firmly believe that I myself derived very considerable benefit from it, but I should be extremely chary of using it in my own case or on others under conditions in any degree less favourable for the very close and minute observation of the effects of each dose than obtain in a sanatorium—conditions which, in my opinion, can only be found in such an establishment. As I have stated above, I am continuing the tuberculin injections as an out-patient, but I need hardly say that after each injection I religiously carry out precisely the same routine as regards "rests," avoidance of over-exertion, &c., &c., as I did in the sanatorium. The injections are, moreover, given by the physician who treated me in the sanatorium, who naturally regulates each dose by the effects produced as shown by the temperature chart, which I keep as carefully as I did while in the sanatorium, and from his intimate knowledge of my "personal equation" and the effects produced by previous doses. Further, from my medical training I have naturally learnt more about the effects of tuberculin *in my own particular case*, and am better able to watch for and interpret symptoms produced thereby than a layman. From what I saw, and heard, I may say that I formed the opinion, be it worth what it may, that tuberculin is a very valuable *additional* curative agent in *specially selected cases, and where the very necessary conditions for very close observation of its effects obtain.*

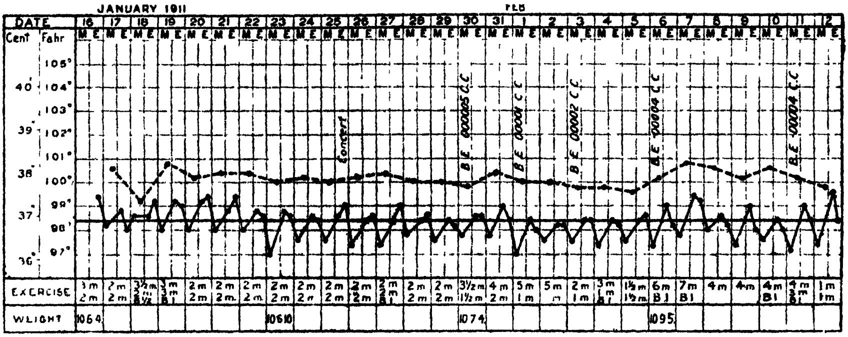
One more point I learnt—namely, the extreme importance of determining as quickly as possible which particular pathogenic organism is taking the most prominent part in producing the symptoms, for though in all cases of undoubted tubercle of the lung tubercle bacilli are (or, at any rate, have been) present, it by no means follows that they are by the time the disease is recognized the most active agents. The other pathogenic organisms most commonly present are, I ascertained, the pneumococcus, *Micrococcus catarrhalis* and the various staphylococci and streptococci.

I saw one or two cases in which little or no improvement resulted from the injection of tuberculin, but which immediately began to improve "hand over fist" when injections of vaccines prepared from one or other of these "foreign" organisms were commenced.

The vital importance of invariably making an examination of sputum for tubercle bacilli, as a routine measure, I mean, even in the absence of anything approaching definite physical signs, I need not dwell upon. The physical signs in my own case were very indefinite, and I feel I owe a deep debt of gratitude to the brother officer who "spotted" my case in the initial stages, owing to his thoroughness in making a routine examination of the sputum. I think he was as surprised as I was myself that tubercle bacilli were present.

The fees for ordinary cases ranged from 3 to 5 guineas, according to the position and size of the bedroom, and this included the use of a "châlet." The only extras were laundry, bacteriological examinations, treatment by tuberculin (about 6d. a dose) or vaccines, estimation of the opsonic index, alcoholic drinks (only allowed when ordered by the physician in charge), exclusive nursing, and bedroom fires. A reduction of 10s. 6d. is made in the case of medical men.

The charges were, in my opinion, remarkably small, taking into consideration the fact that they included doctoring, nursing, board, and lodging, and each of the best.



m = miles B = Billiards (100 up)

THE INSTRUCTION AND TRAINING OF MEDICAL OFFICERS IN THE AUSTRO-HUNGARIAN ARMY BY MEANS OF WAR GAMES.[1]

By Colonel W. G. MACPHERSON, C.M.G.

The medical officers take part in three different kinds of war games:—

(1) The *Etappenkriegsspiel*, or war game for lines of communication services.

(2) The *Sanitätskriegsspiel*, or war game for medical services only.

(3) The *Truppenkriegsspiel*, or war game conducted in regimental units.

All three differ in character from one another and in the nature of the instruction and training given. They are all conducted during the winter months, but usually at different periods. Every medical officer and every officer of the army medical corps detachments[2] attends one or other of the war games.

The *Etappenkriegsspiel* is intended for training in the duties of the higher administrative posts in war, i.e., from the army corps formations upwards. The *Sanitätskriegsspiel* is for training in the duties of army corps, divisional and regimental medical services, i.e., in the duties of medical services in the area of immediate conflict with the enemy. The *Truppenkriegsspiel* is taken part in only by medical officers who are unable to attend a *Sanitätskriegsspiel*.

I.—The Etappenkriegsspiel.

An *Etappenkriegsspiel* is held during December and January in each army corps command. The object is to train and instruct in the work which will be required by the administrative officers of technical services in actual war. It is not in any way intended as a test of the capacity and knowledge of individual officers.

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[1] These notes on the method and details of conducting the military training of medical officers in the Austro-Hungarian Army were made during a visit to Vienna in the winter of 1910, when the Austro-Hungarian War Office kindly permitted its Army Medical Department to give me instruction on the subject. I am specially indebted to Oberstabsarzt Dr. Johann Steiner, of that Department, for his valuable and generous help not only on this but on many other occasions.—W. G. M.

[2] i.e., Non-medical officers, performing the functions of "captains of orderlies."

Personnel.

The officers taking part in an *Etappenkriegsspiel* are appointed to definite staffs and commands as in war, down to army corps and independent divisions. The work is regulated and examined by a directing staff. The following are the officers who form the directing staff, those who do the work, and the posts held by the latter.

A.—*Directing Staff* (*Uebungsleitung*).

1 General Officer.
1 Colonel } of the General Staff.
1 Captain
1 Medical Officer.
1 Intendance Officer.

B.—*Workers* (*Ausarbeiter*).

(*a*) *Army Headquarters Staff*:—
  General Staff: An officer acting as commander-in-chief; an officer assisting him.
  Medical Services: An officer as director of medical services; an officer in waiting, in case the other is unable to attend from any cause.
  Intendance: An officer as chief of the intendance service of an army; an officer in waiting.
(*b*) *Army Lines of Communication Headquarters Staff*:—
  General Staff: A major of the general staff; an officer, general staff in waiting.
  Artillery Services: 1 officer.
  Engineer Services: 1 officer.
  Railway and Telegraph Services: 1 officer.
  Medical Services: 1 officer as principal medical officer; 1 officer in waiting.
  Intendance: 1 officer as chief of intendance; 1 officer in waiting.
  Transport services, automobile services and directorate of army telegraphs are not represented.
(*c*) *1st Army Corps Headquarters Staff*:—
  General Staff: 1 officer; 1 officer in waiting.
  Transport Services: 1 officer as director of transports.

Medical Services : 1 officer as principal medical officer.
Intendance : 1 officer as chief of intendance.

(*d*) *2nd Army Corps Headquarters Staff.*—As above for 1st army corps.

(*e*) *3rd Army Corps Headquarters Staff.*—As above for 1st army corps.

(*f*) *Independent Infantry Division Headquarters Staff* :—
General Staff : 1 officer.
Transport Services : 1 officer.
Medical Services : 1 officer.
Intendance : 1 officer.

(*g*) *Cavalry Division Headquarters Staff.*—As for independent division.

One medical and one intendance officer are in waiting to act as principal medical officer or chief intendance officer of any of the three army corps headquarters staffs, if necessary, and one medical officer and one intendance officer are similarly in waiting for the independent infantry division and the cavalry division.

Method of Conducting the War Game.

The Directing Staff prepares a scheme containing a general military situation, the conditions as regards supplies, and the conditions as regards medical services. This is sent to every officer taking part in the *Kriegsspiel.*

Special ideas are also prepared giving the military situation for each army corps, and for the independent infantry and cavalry division. Separate special ideas are also issued for supply services, for medical services, noting railway conditions, road conditions, bridges, ammunition supplies, and telegraph services. These are also sent to the officers taking part.

Each headquarters staff, after the general and special ideas have been in the hands of officers for a week or ten days, meets under instructions from the officer acting as chief of the general staff at fixed hours and days.

The days of meeting are arranged as follows, supposing the *Kriegsspiel* is to commence say, on Tuesday, November 23 :—

Army Headquarters Staff.—Meets on Tuesday, November 23.

Lines of Communication Headquarters Staff.—Meets on Wednesday, November 23, and Thursday, November 24.

Each Army Corps, Independent Division and Cavalry Division Headquarters Staff.—Meet separately on Friday, November 26.

This represents the first of a series of meetings at intervals of fourteen days as noted below.

The army headquarters staff work out the orders, dispositions, instructions, &c., which would be sent, as in war, to the army corps, independent division, cavalry division, and lines of communication. They must be in the hands of the officers of the commands to which they are issued by 9 a.m. on the day on which the headquarters staff of the command in question meets.

The lines of communication headquarters staff meets on two successive days, as its duties include much additional work in the way of instructions, proposals, requisitions, reports, and so on, in addition to orders and dispositions, all of which must be prepared as in actual war.

The army corps headquarters staffs, &c., which meet on the following day, work out, in accordance with army orders, &c., the orders, dispositions, instructions, &c., which they would issue to divisions and corps troops, as well as requisitions, reports, &c., to army headquarters and lines of communications.

Each staff works by itself, all the members of a staff working together in the same room. Usually two hours are allowed for preparing the work. The chief of the general staff of each staff determines the place where his staff is to meet, and he must report this to the directing staff, in order that the latter may know where papers and other communications are to be sent.

Two copies are made of every written order, instruction, report, requisition, &c., one being sent to the command for whom it is intended, the other to the directing staff. In cases where a command, office, or officer, to whom an order, requisition, report, or instruction is issued, is not represented at the *Kriegsspiel*, as, for example, when orders are issued by army corps to divisions, or requisitions are sent from lines of communication to the War Office, the documents are sent to the directing staff instead.

No appreciation of the situation is, as a rule, required by officers taking part in the war game, but occasionally appreciations are called for, and the first work to be sent in to the directing staff is a statement by the chief of the general staff of the army command showing the intention of the army commander with regard to his plan of operations. Chiefs of the general staff of the other commands send in instructions issued to the technical and departmental services in accordance with the intentions of the army commander, while the chief intendance officers ends in a statement of his arrangements for supplies, and the principal medical officer of the lines of communication a statement of his calculations and requirements for evacuation of sick and wounded.

The next step after the meetings of the various staffs is the conference held by the directing staff. It takes place eight days after the staff meetings, and lasts two days, i.e., in this case, on Friday, December 3, and Saturday, December 4.

Every officer taking part in the war game is present at the directing staff's conference.[1] The directing staff goes over the work done by the various staffs, criticizes it, asks questions and explanations of measures taken and orders issued, and gives out various papers, diagrams, &c., dealing with the new situation. The diagrams include a general map, showing the situation as estimated by the work sent in to the directing staff, a diagram showing the general position of army corps and units on lines of communication, a diagram showing the situation with all units marked in detail, combatant units in black, medical in red, and supply in green, railway time tables and routes for each day, and tables showing movements of sick and wounded.

The conference takes place in some large central lecture room at army corps headquarters. Each officer has a table to himself and a map (1 : 200,000) of the area of operations. In addition a large wall map is used with the situations marked on it, and various diagrams prepared by the directing staff are also hung up.

Two days after the conference, the various headquarters staffs again meet in succession, as before, to work out orders, instructions, &c., for the new situation, sending in copies to the directing staff, and generally conducting their work, as described above. Thus the army headquarters staff would meet on December 6, the lines of communication headquarters staff on December 7 and 9 (December 8 being a holiday), and the Army Corps and independent division staffs on December 10.

Eight days later—i.e., on December 17 and 18, the second directing staff conference would be held, and diagrams and papers for the new situation issued.

This would be followed two days later by a third series of meetings of the various staffs, and by a third conference after the usual eight days' interval.

A fourth series of meetings of staffs and a fourth conference would terminate the war game for the year.

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[1] The officers in waiting are present both at the meetings of their staff and at the conference, but do not take part in the work.

General Notes.

Orders, dispositions, instructions, reports, requisitions, &c., are all to be written and issued as in actual war. Brevity and lucidity are the points to which greatest importance is attached, but short notes can be made in the margin noting any point upon which an order or disposition is based.

The army field notebooks and stationery are used. Copying paper and pencils are also employed, but hectographing is not permitted except when hectographing blocks are used in actual war.

Each document sent in must have the name and rank of the officer working out the order, instruction, &c., entered on the right hand upper corner of the paper, and the date in red or blue pencil in the centre.

Messages which in war would be given verbally are to be sent in in telegraphic form.

The hours and places at which orders are issued and received must be properly calculated, as in actual war.

Special Notes relative to Medical Services.

The diagrams issued by the directing staff give minute details of the position of medical units and the number of sick and wounded in different parts of the field, &c., according to each situation.

For example, the situation of the war game, which was used as an illustration, was that of a continuous battle of several days' duration, and the problems for the staffs of army corps, and lines of communication were mainly those of feeding, sheltering, bringing up supplies, and evacuating sick and wounded.

In the diagrams the accommodation in each medical unit would be shown against the conventional sign denoting the unit, and the actual number of patients in it would also be shown, in the form of numerator and denominator. Thus the conventional sign on

$$\left.\begin{array}{c}\text{Sign}\\ \text{of a}\\ \text{Field}\\ \text{Hospital}\end{array}\right\}\text{ with }\left\{\begin{array}{c}\text{No. 1}\\ \dfrac{900}{400+300}\end{array}\right.$$

the map would mean field hospital No. 1, with accommodation for 900 patients, and having 400 of its own army and 300 of the enemy's wounded in it. If all the patients belonged to its own army and none to the enemy, the numerator and denominator would be shown thus: $\frac{900}{700}$.

The tables showing the movements of wounded would show the number of sick and wounded in various areas occupied by the army on each day of the operations. Thus the first day of the battle would have a table somewhat as follows:—

On lines of communication	1,850 sick.
In X (some town or city)	700 wounded.
In area south of Y	*Nil.*
,, ,, Z	6,000 wounded.*

* 10 per cent. of fighting strength.

In addition to the diagrams and tables prepared by the directing staff the principal medical officers of each headquarters staff must prepare a table showing the exact position day by day of the various units connected with the medical services under his command. This table is called an *Evidenz* and is of the simplest character, somewhat in this form (using letters instead of actual names for towns or villages).

Unit Date	Field Hospital No. 1	Field Hospital No. 2	Field Hospital No. 3	Mobile rest station	Field convalescent depot	Advanced depot medical stores
1	A	E	—	X	X	Y
2	B	E	—	A	A	Z
3	B	E	—	A	B	X
4	B	F	—	A	B	X
5	C	F	—	A	B	X
6	D	G	—	A	B	X

This *Evidenz* is sent in to the directing staff at the end of the war game.

The chief intendance officer of each command, it may be mentioned, sends in a similar *Evidenz* showing the position of supply units each day.

At the meetings of the various staffs to work out orders, &c., each head of a technical service prepares the orders relating to his own service and hands them in to the chief of the general staff for inclusion in operation orders. The medical orders thus form a special section of operation orders under the marginal heading "Medical Orders." The chief of the general staff must initial each paragraph to indicate to the directing staff that he approves of them. If he does not approve of any order prepared by the principal medical officer he must send the order in to the directing staff, but note briefly in the margin his disagreement with it and his reasons for disapproving. In actual war if the chief of the general staff disagreed he would simply alter or omit the order,[1] but in this case the directing staff is able to give a decision at the conference and criticize the differences of opinion.

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[1] The principal medical officer can dispute the disagreement of the chief of the general staff by placing the matter of disagreement before the general officer commanding.

There is no office staff, such as clerks, &c. The officer acting as principal medical officer of a headquarters staff must do all the work himself. The second officer in waiting does not assist. He is only there for the purpose of being at hand to carry on the war game in the event of the officer acting as a principal medical officer being ill or unable to continue the war game from any cause.

II.—THE SANITÄTSKRIEGSSPIEL.

The *Sanitätskriegsspiel* is totally different from the *Etappenkriegsspiel*, and is conducted entirely by the medical service of the army. Formerly it was much of the same nature as an *Etappenkriegsspiel*, conducted by general staff officers, and with medical officers appointed to different positions; but now a new method has been introduced which makes the *Sanitätskriegsspiel* more of the nature of a series of lectures or conferences. It is, in fact, called an *Applikatorische Besprechung für Winter*, or a practical series of conferences for the winter.

The object is to maintain a uniform standard of training amongst medical officers in medical strategy and tactics. Schemes and problems are prepared by the officer commanding the Army Medical College, Vienna, assisted by the lecturers on field medical organization and staff work as applied to medical services. The schemes are then printed and issued to all headquarters of army corps (i.e., to the principal medical officers of army corps), and also to the officers commanding garrison hospitals in towns which are not the headquarters of an army corps, such as Linz, Laibach, and Josefsstadt. These officers become the directors of the war game. A general staff officer is appointed to assist each director to see that the work conforms correctly with military conditions and situations, and generally to direct the movements of combatant units. A director of a war game, i.e., an army corps principal medical officer, may, if he chooses, also appoint a junior medical officer to assist him.

All medical officers of the garrison, including medical officers of the *Landwehr*, medical officers with regiments, and the officers of orderlies (*Sanitätstruppenoffiziere*) must attend and take part in the *Sanitätskriegsspiel.*

With the general scheme printed and issued from the Army

Medical College, there are also maps and special ideas for the principal medical officer of an army corps, principal medical officers of divisions, and officers commanding field ambulances and field hospitals, as the case may be. Thus the special idea for a principal medical officer, army corps, would contain the orders and instructions issued by the army headquarters staff and the director of medical services, and he would then have to work out the disposition and orders for the divisional principal medical officers and for any units immediately under him, such as field hospitals attached to the army corps.

The kind of problems set and the nature of the work required by the officers taking part in this war game are exactly similar to the problems in v. Hoen's "Strategical and Tactical Employment of the Medical Service," a translation of which has been published recently by the British General Staff.

The peculiar features of the *Sanitätskriegsspiel* are that no officers are nominated definitely to act as officers holding any special appointment in the war game, and there is no written work. Each officer taking part in the game receives copies of the general scheme, maps, special ideas and other papers issued by the directors about eight or ten days before the first conference. He studies the problems and situation at home by himself, and must be prepared at the conference to dictate orders, &c., when called upon to do so by the director. The work is carried on entirely by word of mouth, and in the form usually of question and answer, with explanations and criticisms by the directors.

A large war game map of the area of operations (1 : 12,500) and blocks are used. They are obtained from the garrison staff, these maps being generally kept for the use of regiments and regimental war games in regimental messes.

The *Sanitätskriegsspiele* take place in February, and last for three or four days, of two hours each, within the same week. Formerly they were conducted, more like the *Etappenkriegsspiel*, at weekly intervals of one day of one hour each for eight weeks. The eight hours thus required are now compressed into one week of three or four days of two hours each.

The general plan of conducting the war game is for the Army Medical College to issue a special idea for the first day, dealing with problems for the principal medical officer of an army corps; for the second day, problems for the principal medical officer of a division; and for the third and fourth days problems for the officers commanding the field ambulances or field hospitals. The fourth day may also be devoted to regimental medical service problems.

III.—THE TRUPPENKRIEGSSPIEL.

Medical officers who from any cause are prevented from attending the *Sanitätskriegsspiel,* as, for example, medical officers with regiments in out-of-the-way or small garrisons, must attend the ordinary regimental war game (*Truppenkriegsspiel*). They are then given special problems to work out in connexion with medical services, set either by the officer commanding the regiment or by the senior medical officer. These war games have otherwise no special features affecting army medical training.

United Services Medical Society.

SESSION 1911-1912.

ADDRESS BY THE PRESIDENT,

MAJOR E. B. WAGGETT,

Royal Army Medical Corps (*T.F.*)

I PROPOSE to begin my term of office by omitting the first item on the agenda, namely the Presidential Address. I have only to make a word or two of explanation.

Hitherto this chair has been held by officers of the highest distinction in the regular services, it is now occupied by a Territorial officer, and this fact requires some explanation as the reason is important.

The Society holds its meetings at the Royal Army Medical College, and the notion has gone abroad that it is largely a Royal Army Medical Corps institution. It is, in fact, nothing of the kind, and a very large section of the members belong to the Navy, to the Indian Medical Service, and to the auxiliary forces both of the Navy and Army. It is to emphasize this point that the Council has done me the great honour of nominating me as President.

It is a difficult task for me to preside at these meetings as I cannot hope to add anything of value to the discussions, and I therefore propose to justify the confidence of the Council by devoting my year of office to bringing officers of the auxiliary forces into closer touch with the Society.

It is a very great privilege for us at these meetings to come in contact with the experts, and by listening to their papers and discussions to gain a view, in proper perspective, of the problems we are concerned with. We all recognize that it is impossible to gain real working knowledge from text-books, and that this comes only from contact either with the actual facts or with the minds of men who really know. The actual facts are not available for us, and especially for the officers *à la suite*—and this Society affords precisely that access to the minds of the experts which is necessary if we are to do our work properly on mobilization.

At the outset some of the officers *à la suite* were inclined to regard their military function in the light of a joke, to-day they are realizing more and more that the responsibility they have undertaken is a very serious one. Many distinguished physicians and surgeons are present to-day and many more have written to express their genuine regret at unavoidable absence. It would, I think, be well that the fact should be widely known that any officer is entitled ex officio, to admission to the Society on the payment of a nominal fee. The Council welcomes papers from officers of the auxiliary forces, and, as I know from personal experience, the Society listens to our papers with an interest so remarkably well feigned as almost to deceive. Two meetings this session (February and May) have been set aside for papers from officers of the auxiliary forces; I shall be very glad to receive suggestions for discussions or titles of papers. Papers will also be read upon subjects which directly concern us, namely upon the function of the clearing hospital and upon the diseases to which auxiliary troops are specially prone.

The Honorary Secretaries, Fleet Surgeon Laurence Smith and Major Harrison, have secured for the opening meeting a paper upon what is, after all, the ultimate purpose of an armed force, the destruction of the enemy. Major Pilcher, who gives us his experiences with the new pointed bullet, is known to most of us; the few who do not know him personally are already under an obligation of gratitude to him which will shortly be increased.

THE POINTED BULLET.

By Major E. M. PILCHER, D.S.O.,
Royal Army Medical Corps.

Many of the great Powers have comparatively recently adopted a light pointed bullet in place of the more or less blunt-nosed one at present in use. So far as I am aware this bullet has not yet been submitted to the test of actual warfare, but a certain amount of experimental work has been done with it, the results of which are extant in various languages. To go fully into all these experiments is not the purpose of the present paper, as the time at my disposal is too short, but I hope to give some idea of the changes in wounding power which may possibly result from the qualities of increased ranging power and greater instability of the new missile.

Now the object of most of the changes in the shape and material of bullets, from the round sphere of soft lead to the thin elongated, cylindrical-bodied and taper-nosed "picket" made up of a hardened lead core and a harder rigid envelope, has been first and foremost an improvement in ballistic qualities, the chief of which are accuracy and range. It was to attain the former desideratum that rifled arms were introduced in about 1800. Difficulties in making the soft round ball fit the grooves of the rifling paved the way to the introduction of the cylindro-conoidal bullet in 1851. The introduction of the breech-loading principle in 1867 and of the magazine rifle in 1888, with their increased rapidity of fire and the consequent need for increased supplies of ammunition in the field set small arms experts to work upon a class of ammunition which should be lighter, while the growing importance of increased range and flat trajectory compelled the rejection of the soft lead bullet which would not engage in high pitched rifling, in favour of a hardened composite bullet, and of black powder in favour of a mixture of nitro-glycerine and gun-cotton. From the soft lead sphere to the composite bullet, then, the path may be traced through the rifled barrel with gradually increasing pitch, the breech-loading and magazine principles, and the introduction of high explosives.

A second object of improvements in small arms projectiles is the attainment of all those good military qualities which are summed in the word handiness. As far as the nature of the bullet is concerned the most important of these is weight, a smaller and lighter bullet meaning that more ammunition can be carried in pouch and bandolier, while the influence of a lighter bullet on recoil and rapidity of fire may perhaps be considered as secondary factors.

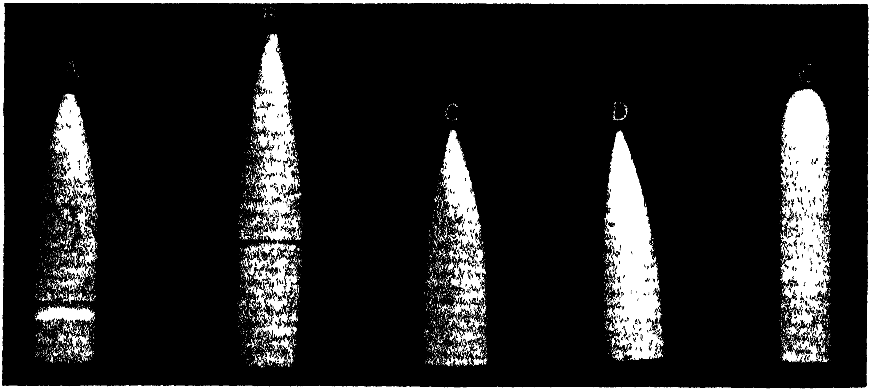
A third consideration, which seems to have been put somewhat in the background by the designers of the small-bore bullet, is wounding effect. Having got the bullet to reach a certain point with the most constant accuracy and with the highest possible velocity, what is it going to do when it gets there? I may say at once that no complaint was heard of a want of wounding or stopping power until the small bore ·303 in. bullet was introduced in 1892. I need not recall to your minds the controversy which was raging on this subject in that year and subsequently. Experiments were made in many countries on living and dead animals and on human cadavera, both with full charges at normal ranges and with calculated charges at short ranges, with the result that an astonishing diversity of opinion was revealed. Some experimenters dubbed the new missile humane, while others were contented with no less severe an epithet than devilish. Meanwhile war experience, the only trustworthy alembic of opinion, was accumulating and proved to demonstration that neither side was altogether in the right. Compared with the Martini-Henri bullet it was found that with the new bullet:—

(1) In highly resistant structures like bone explosive effects were seen at longer ranges.

(2) In soft parts with low resistance wounds were much less severe, due chiefly to the small calibre of the bullet.

(3) Owing to the flat trajectory and long range, more hits were made.

(4) Surgically, the small size of the openings and track in practically every structure but bone had an immense influence on the subsequent course of wounds, especially with reference to the likelihood of infection.



	Old.				New.			
	Length	Calibre	Weight	Material	Length	Calibre	Weight	Material
A	1·25	·311	215	Pb. Cu. Ni.	1·300	·312	174	Pb. & Al. Cu. Ni.
B	1·221	·322	231	Pb. Cu. Ni.	1·625	·327	198	No envelope Cu. Zn.
C	1·235	·318	227	Pb. Fe.	1·105	·323	154·5	Pb. Ni. Fe.
D	1·26	·308	219·5	Pb. Cu. Ni.	1·08	·308	150	Pb. Cu. Ni.
E	1·28	·256	162·9	Pb. Cu.	1·28	·256	162·9	Pb. Cu.

(5) Though against big game or extremely determined foes like Ghazis, the stopping effect was often insufficient, yet on the whole the small-bore bullet had an efficient wounding effect when used between civilized peoples, and the compensating military advantages were considerable, while the ballistic improvement was so great as almost to condone the alleged want of man-stopping power.

This summary may serve to introduce the comparison I propose to institute between the new pointed bullet and the ogival-tipped bullet in present use. I have given a photograph of four of these new bullets and a table showing the characters in which they differ from their ogival-tipped predecessors. You will see that they all differ slightly but not materially in the relation of length to calibre. One has no envelope, but is a solid picket of copper-zinc. Of the three composite missiles the material of the envelope is cupro-nickel in two, nickelled steel in the third, while the core is hardened lead in two, and in the third hardened lead in the lower two-thirds and aluminium in the upper third. So much for their differences. Taking their common features I find that two are constant, namely the sharp point and the diminution in weight. On the face of it both these characters are essentially ballistic and tend to an increase or retention of velocity. The same charge will produce a higher muzzle velocity in a lighter projectile, and Mr. Boys' diagram demonstrates the value of a sharp point against air resistance. The diminished size of the following eddy with the pointed bullet should be noted. This can be taken to represent the backward pull of the displaced air and can be further diminished by tapering the base, as has been done in one of the examples figured (B); but this slight backward pull, like the feathering of an arrow, has its value in keeping the base of the bullet behind its point and so increasing the steadiness of flight.

But there is another ballistic property of these projectiles which does not immediately appear. It is usual to consider the wounding effect of a bullet as being chiefly due to its velocity, its cross section area and the character of its envelope. The last of these three factors is one of immense importance from our point of view, the principle which underlies it being the fact that the presentation of a large area on impact gives the major part of its wounding power to a bullet whatever may be its remaining velocity on impact, and the character of the envelope obviously determines the liability of the bullet to break up or mushroom. When the deficiency of the small bore bullet in stopping power was first made manifest, an endeavour was made to reproduce the mushrooming qualities of the old leaden bullet by various devices with which you are all familiar, and which practically all meant that the bullet broke up, the leaden core on impact leaving its hard sheath and being spread abroad or broken up in the tissues.

There are, however, other means whereby increased area on impact is brought about. One is seen in the natural flight of the bullet.[1] It has frequently been observed that at very long ranges the degree of bone injury is unexpectedly extreme, and the accepted explanations have been, first that the bullet moving in the tangent to the curve of the trajectory, which tangent approaches the perpendicular at long ranges, must necessarily make a lateral impact, and secondly that although the movement of rotation declines more slowly than that of projection, yet at ranges exceeding 1,000 yards the gyroscopic steadiness due to rotation is gradually lost, and wobbling takes place about the line of the trajectory, causing lateral impact in certain positions of the wobble. Here, then, are principles of extreme importance as regards wounding effect. Can a bullet be so constructed as to have a natural tendency to make lateral impact at all ranges? And if so what are the physical features to be emphasized in its manufacture to that end?

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[1] Without necessarily involving any alteration in the shape of the bullet.

Now there is reason to think that the mere relation of length to cross section area may have a great effect in producing a tendency to unsteadiness. I have added therefore to the four pointed bullets an example of the Japanese bullet of ·256-in. calibre and 1·28 in. in length. This bullet which is evidently quite up to the average in length, but considerably below all the others in calibre, is reported from the Russo-Japanese campaign to have made at 800 to 1,000 paces larger perforations than at shorter ranges *owing to the unsteadiness of the bullet*, and at these distances clothing, &c., was often carried into the wound. Lateral impact seems the only explanation of these effects.

There is another physical peculiarity of the pointed bullet which must be noted. The effect of shaving off the tip and shoulder to a fine point is to throw the centre of gravity very far back, so that a greater length of the bullet lies in front of than behind the centre of gravity. In some of these bullets a large part of the cylindrical body is sacrificed to increase the length of the slope of the pointed portion. No bullet travels with absolute accuracy in the curve of the trajectory. But whereas a slight deviation of the point might not affect the substantial accuracy of *flight*, on *impact* the longer the space between the tip and the centre of gravity the more effective would be the couple which tends to make the bullet revolve upon a transverse axis. And this principle is effective at all ranges. We may expect the pointed bullet, then, to develop unsteadiness immediately upon impact, thus developing to a high degree the principle of wounding effect due to increased area on impact. It is a modification of the wobble impact glorified into a military factor of great importance.

To turn from theoretical considerations to the facts brought out by experiment, I should begin by saying that probably experiments upon the smaller domestic animals recently killed give results which are nearest to the truth. Human cadavera always give an exaggerated idea of the injuries produced, owing partly to post-mortem rigidity, partly to the inevitable hardening which accompanies any process of preservation. And the bones of the larger domestic animals such as horses, cows and donkeys are so much harder and more resistant than human bones that it is impossible to fairly infer from injuries produced in them what human bones would show under like circumstances. It should also be added that reduced and calculated charges at fixed short ranges were found, in experiments with the ogival tipped bullet, to produce more humane effects than full charges at ordinary ranges.

Premising so much I will shortly summarize the results of experiments with bullets A and C, and I think we may assume that they are typical of the kind of wound which may fairly be expected from this class of projectile.

The experiments with A bullet were made on recently killed sheep and horses with calculated charges at a fixed short range, the bones being subsequently skiagraphed, and the soft parts carefully dissected. The bullets, after traversing the body of the animal, were caught in boxes containing sawdust, and their position and integrity carefully noted. The velocities were calculated for ranges varying from 100 to 2,000 yards.

The entrance wounds were invariably small and typical. Explosive exits were observed in 30 per cent of wounds, and in one-third of these the soft parts only were involved. The effect of high remaining velocity is seen in the greater frequency of explosive exits at ranges up to 500 yards, and of high resistance in the explosive exits shown in wounds of the hard bones of the horse. There were no explosive exits at 1,500 and 2,000 yards.

The bullet was deformed in 28 per cent, and broke up in 13 per cent. This was due to its composite character, and was not unusually frequent. Deformation on impact was a common character of Mauser bullets in South Africa.

Lodgment in the tissues occurred in 10 per cent, and then only at ranges over 1,500 yards.

Turning on a transverse axis occurred in 63 per cent of all wounds. Deflection (by which, as compared with turning, I mean that the bullet took a new direction) also occurred in 13 per cent of cases, and this at all ranges, and even in soft tissues. This is unusual as compared with the ogival-tipped bullet, and is probably due partly to the unsteadiness and partly, perhaps, to the lightness of the bullet.

As regards the severity of the injuries produced only 17 per cent can be compared with the slighter perforations of the ogival-nosed bullet. The remainder were decidedly severe at all ranges, and this severity was especially noticeable in the soft parts, where experience of the ogival-tipped bullet has led us to expect simple perforation. So far as our own war experience has taught us, explosive exits are invariably associated with bone injury, but the Russian experience in Manchuria against the unstable Japanese bullet was that soft parts also (and typically the large solid viscera, such as the liver, kidney and spleen) showed explosive effects at short ranges. Here, then, is a notable increase of severity in wounding effect as compared with the ogival-tipped bullet. Thus tracks through muscles were an inch or more in diameter, often with explosive exits, wounds in soft viscera like the heart showed a good deal of laceration at the point of exit of the bullet, and the wounds in the various parts of the intestinal canal showed rents rather than simple perforations in nearly all cases.

Injuries to bone looked rather more severe in the dissected specimens than in their skiagrams. The highest degrees of comminution seen occurred in the cannon bones of horses at 300 to 500 yards. But these bones have a very thick layer of compact tissue in the walls of the shaft and would offer a very high degree of resistance to the bullet. Nothing comparable in solidity is found in the human body. In most of the other diaphyses it is possible to trace the type injury described by Mr. Makins, the stellate, the wedge and the oblique, though it must be admitted that the degree of comminution was high at all ranges, and in most cases there was a considerable space quite cleared of bone. This, however, may be frequently seen with the ogival-tipped bullet at short ranges. The superior wounding effect of the new bullet is due to its greater ranging power and consequent extension of distance at which high comminution may be seen. But, judging by the skiagrams, there was no greater appearance of that complete severance of small bone fragments which necrose and delay consolidation so much in all severe bullet wounds of shafts. This is where a dissected specimen may be somewhat misleading. It shows *all* fragments, whether completely separated and useless or partially adherent by periosteum and of great value in maintaining a certain continuity between the broken ends, and affording a kind of framework, in the interstices of which callus is laid down. Wounds of cancellous bone of any thickness, such as the ends of the larger bones and the bodies of the vertebræ, showed a much higher degree of severity than similar wounds with the ogival-tipped bullet. A small opening, a large track and considerable comminution was the rule, especially at the point where the bullet left the bone, and in the soft parts immediately beyond. These results are quite explicable upon the theory that instability is developed immediately upon impact, and further illustrations of the same effects are afforded by multiple wounds. Thus a bullet involving both scapulæ in an animal inflicted incomparably greater damage on the second after comparatively clean perforation of the first, and a wound of the heart inflicted by a bullet which passed through an intercostal space was of nothing like the severity of the injury produced by a bullet which had previously touched a rib.

These results, the most important features of which are given in the above summary, are of great interest though not quite as complete as might be desired. We should have liked more information on head wounds, a class of injury which for obvious reasons can hardly be reproduced in animals in a form comparable to like injuries in man. And injuries to the larger viscera have to be inferred from wounds of soft parts as a whole. But I think the following points stand out :—

(1) Wounds of entry do not as a rule exceed the calibre of the bullet in size.

(2) The simple flesh wound type of injury is uncommon. Wounds of soft parts usually exceed considerably the diameter of the bullet in size, and the laceration of the viscera is more severe than with the ogival bullet.

(3) Explosive exits are common at ranges up to 500 yards at least, and are seen in wounds of soft parts only as well as in those of bone.

(4) Comminution of both compact and cancellous bone is rather more severe, especially on the exit side of the wound.

(5) At all ranges the bullet has a marked tendency to turn on its short axis on meeting with any considerable resistance.

These two main theses, the tendency of the pointed bullet to turn and the resulting increase in wounding effect, is also illustrated and supported by a long series of experiments with Bullet C. It is impossible to do more than summarize them, and I thought perhaps the best plan would be to shortly describe three experiments in order to give you an idea of the path and behaviour of the bullet after impact.

In the first experiment four pasteboard screens each composed of two walls of pasteboard rather less than ¼ in. thick separated by a 2 in. interval filled with sawdust, were erected, each one 12 ins. behind the other. Behind this series of screens and at a distance of nearly 5 ft. was a box to catch and stop the bullets and containing a thickness of more than 4 ft. of sawdust for that purpose. A shot fired at 1,250 yards range pierced the first two screens without turning. The front wall of the third screen had a somewhat enlarged but round opening, the back wall showed an oblique exit. The bullet then entered the front wall of the fourth screen obliquely with the point to the left, made its exit with the point above and to the left, and after crossing five feet of air space entered the bullet-catching box with the point below and to the left. On this shot the experimenter remarked that the resistance of the sawdust was obviously the sole factor in causing the turning, because round openings only were made in five pieces of cardboard placed 2, 12, and 20 in. from each other without sawdust and fired at at the same range.

In the second experiment the screens and bullet-catcher were arranged as before, but in front of them was placed a human hand at a distance of 32 in. from the first screen. A shot involving the first phalanx of the fourth and the middle phalanx of the fifth finger was fired and its course marked on the screens. The first entry wound in the finger was round and small, the first exit oval, the second entry was oval, the second exit a long slit larger at one end than the other. And it will be seen that in traversing the screens and the intervening air spaces up to the bullet-catcher the bullet made a complete turn upon its transverse axis. That this result is not quite invariable was shown by the third experiment.

In this the screens and bullet-catcher were placed as before, and in front of them was placed a human thigh separated by an interval of 32 in. from a human leg which again was 4 in. from the nearest screen. The thigh was an injected and preserved specimen, the leg a fresh specimen. A shot was fired which made a flesh wound first in the thigh with a typical small bore entry and for exit a vertical slit rather longer than the diameter of the bullet. The bullet then entered the leg preparation just internal to the tibial crest, making an entry nearly round and but slightly larger than a normal entry, comminuted the tibia and fibula, and made an explosive exit on the outer side. The entry into the first screen showed the bullet with deformed point, and turned into an oblique position with the point downwards. But instead of the continued turning noted in the second experiment, all the succeeding screens show that the bullet retained much the same position in passing through them and through the 12 in. intervening air spaces, and it was not until the final air space of 5 ft. was reached that a further small amount of turning took place. The sudden stoppage of turning was almost undoubtedly due to the fact that the crushing together of the bullet against the hard edge of the tibial crest (an effect often noticed before) brought the centre of gravity farther forwards so that it corresponded more nearly to the centre of the bullet's length and so interfered with the turning forces.

These experiments seem to me to show first that the new bullet has a tendency to turn on meeting with any resistance, and secondly, that the side pressure to which it is subjected in the tissues has a tendency to control and check the turning. You will observe that in air spaces where resistance is least, turning is most marked. In soft tissues, such as the abdominal cavity and the lungs (in which gas is, in a manner of speaking, a normal constituent of the organs), turning will be probably a good deal more marked than in more compact tissues, such as muscle and bone, but in both it will be sufficiently marked to give high wounding effects.

I may quote the conclusions arrived at by the author of the above experiments in his own words. "The chief characteristics of the sharp pointed bullet as compared with the ogival are, the much increased initial velocity as well as the unusual tendency at all ranges to continued turning, as soon as the slightly turned point meets greater resistance on one side."

Consequently we may expect larger skin openings on the exit side, as a rule, with greater consequent liability to skin infection, more severe injury to soft parts, in which the viscera will share to a marked degree, but perhaps no such corresponding, at any rate no extreme enhancement of injury to bone, with the possible exception of cancellous bone.

To sum up, then, it would seem that in the pointed bullet we have a projectile which causes wounds of a definitely increased severity, when compared with the ogival-tipped small bore bullet. But when we go farther back to the days of large bore bullets, I question if the contrast is by any means so striking. Few of us have seen many wounds at short ranges by Snider and Martini bullets, and fewer still those of the old leaden bullet. But there is no doubt in my own mind that they were of a more severe type (at short ranges) than those with which we have been familiar since 1892. I had once on the Indian Frontier an opportunity of seeing a number of wounds which had been inflicted by Pathans armed with Sniders and Martinis, and I was greatly struck with the severity of the injuries produced. I remember especially a Gurkha with both bones of the forearm shattered and the tissues frightfully lacerated by a Snider bullet. Explosive exits, in short, are no new things, and indeed, it is doubtful if those we see are so severe as when the effect of large bore was added to high velocity and short range. One gets hints of this from strange quarters. Remember the remark of Archibald Forbes, the war correspondent, that in the battlefields of 1870 it was easy to distinguish men wounded in the chest by the whistling of air in and out of the wounds. Now nothing is better established than the fact that pneumothorax is a very uncommon complication of small bore wounds of the chest. Wounds with the pointed bullet, then, seem to be in part a reversion to an old type due to large bore and short range. Add a high increment of velocity, so that the same effects are produced at comparatively long ranges, and you have precisely the injuries we are discussing, with this exception, that in an uncertain proportion no turning, or very slight turning, takes place, and the simple flesh wound type is possible even when bone is involved.

It is to be remembered, too, that no experimental work, however realistic the conditions are made, can possibly reproduce exactly the varying possibilities of impact in actual warfare. Exactly the same prognostications of increased severity were made when the ogival small bore bullet was introduced, and were shown by war experience to be only partially correct. Moreover, a bullet acting in a manner and upon principles similar to those which underlie the movements of the pointed bullet has been actually used in Manchuria, and it is quite clear that severe results did not invariably ensue. Nevertheless, experiment is the groundwork of reasonable presumption, and with proper reservations and allowances should be a guide to preparation for war. Some, at any rate, of the prophecies which our friends across the water are so fond of making came true as regards the ogival small bore, and it would be wise for all nations to be prepared for some of the new effects foreshadowed in this paper.

DISCUSSION.

Lieutenant-Colonel J. B. Wilson, R.A.M.C., thought that the results of experiments on dead carcases should be taken with a certain amount of reserve, since parts hanging up were in a different physical condition from living animals on their feet. He agreed with Major Pilcher that the essential difference between the new types of bullet and the old ones was their tendency to turn on their short axis.

Major E. B. Waggett, R.A.M.C., asked whether the material of which the bullet was composed had any influence on the wounds produced by it.

Major H. A. Bray, R.A.M.C., asked whether the great proportion of large exit wounds, which one would expect in the future, would not necessitate some changes in the first field dressing.

Fleet-Surgeon Home expressed the opinion that one would probably find great differences between the wounds produced in dead carcases and those produced in tense living tissues.

Major Pilcher, in reply, said that there was no evidence as to the influence of the material composing a bullet on the wounds made by that bullet. With regard to the criticism as to the differences between experimental results on carcases and those actually got in living bodies, the results of experiments with the ogival bullet were confirmed in the main by the results found in the field. With regard to Major Bray's suggestion it was very probable that some modifications in the first field dressings would be called for, but a large number of the exit wounds would be such that no first field dressing would be effective.

The President, in thanking Major Pilcher for his interesting paper, said that it was such papers which illustrated the necessity for such societies as the United Services Medical Society, since the constant changes in war material and war methods necessitated constant study and discussion on the part of the medical branch of the Army to keep abreast with them.

Clinical and other Notes.

A CASE OF BILHARZIOSIS OF THE RECTUM.

By Major J. D. GREIG.

Royal Army Medical Corps (T.F.)

In July, 1906, there came under my notice an engine fitter, aged 24, who had been suffering from "diarrhœa with pain" for a period of three weeks. His family history was quite unimportant. He had always been a strong healthy man, an abstainer and a non-smoker, and had recently returned from South Africa where he had been following his employment during four years. He had no illness to record previous to January, 1905, when he contracted a gonococcal urethritis, and he thought he had not entirely got rid of that when he came under my observation. In December, 1905, he was bitten by mosquitoes, and this, he stated, was followed by numerous attacks of malaria, for which he was attended by a doctor in Durban. With each attack he was laid up from four days to a week. In the beginning of May, 1906, he first noticed that he was not so well and that he was getting thinner. He was ordered home on account of his physical deterioration which was ascribed to malaria, and he somewhat improved during the voyage. Three weeks ago, when in Glasgow, he had another attack of what he called "malaria," and this was accompanied by diarrhœa which, though bad enough during the day, was worse during the night and prevented his sleeping. The pain at this time was not very severe, but it increased in intensity until on his admission to the Dundee Royal Infirmary the severity had become extreme. The pain was localized in the rectum, was constant and of a stabbing character. Only a week ago he noticed for the first time that there was blood and a good deal of mucus in the motions and these features had been characteristic and continuous since. The pain was worst during defæcation and there was occasionally interference with micturition, sometimes followed by considerable pain in the urethra, though there was no evidence of involvement of the bladder and the urine was normal.

On admission he was seen to be a pale-faced, delicate-looking man, rather thin and with an anxious expression. There was no enlargement of the liver, but palpation of the abdomen showed some tenderness in the left iliac region. His appetite was poor, his heart and lungs normal. His nervous system was also normal, though his sleep was much interfered with by the frequency of the diarrhœa and the severity of the pain. Examination of the rectum without a general anæsthetic was impossible on account of tenderness. When an anæsthetic was given, and the finger passed into the rectum, there was discovered what appeared to be a large and extensive malignant ulceration of the bowel, more especially over the anterior surface of the rectum, while a little higher up the whole circumference was involved. It did not seem to be a case for operation and for a few days he was merely kept under observation. During this time he continued in much the same condition and the prognosis seemed exceedingly bad. A morphia suppository was given nightly, and each morning the lower bowel was washed out. Within ten days an unexpected improvement had set in, the severity of the symptoms had diminished, and his general condition was rendered much more comfortable.

Matters stood thus when I had the pleasure of showing round my wards Major J. F. W. Rait, of the Indian Medical Service. I was telling him of the unexpected improvement in this man and he in turn related to me that he had recently seen a soldier of one of the British regiments stationed in India, which had arrived there from South Africa. The soldier was a young man, strong and healthy and had developed what appeared to be a carcinoma of the rectum. Microscopic examination of scrapings taken from the ulcerated surface showed the characteristic ova of Bilharzia and the case which had been given up as hopeless, recovered under rest and local treatment.

I was much impressed with this narration, for it at once occurred to me that such a condition would explain some of those symptoms in the case under my care which were not usually found in carcinoma of the rectum, such as the rapid onset, the severity of the pain, and the improvement under local treatment. On the following day I had my patient again anæsthetized and took scrapings from the affected surface of the rectum. Examination of these proved the diagnosis to be correct and that the condition was not a carcinomatous one, and the prognosis was materially altered. The local and constitutional treatment was continued as before. In the course of another month the condition had entirely cleared up, the ulceration and all signs of disease, and all his uncomfortable symptoms disappeared and the rectum on examination disclosed apparently a perfectly normal mucous surface.

Dr. A. W. May, Government Bacteriologist for the Transvaal, has published a short account of a specimen obtained from the stomach of a Chinese coolie. It consisted of a small pedunculated growth which on section was found to be somewhat cystic and examination of the contained fluid showed considerable numbers of terminal-spiked ova of Bilharzia.

Affection of mucous membranes is not uncommon, but affection of the gastric mucous membrane is certainly very rare. In this country it is unusual to come across such a case as the above. The very existence of the rectal affection is as a rule unknown, and the sporadic nature of the cases facilitates error in diagnosis. According to Madden the parasite is most commonly found in the portal vein and its tributaries within the liver. It is also found in the mesenteric veins and their tributaries and in the submucous tissue of the bladder and rectum. The ova are oval and curiously spiked laterally or at one end. The early inflammatory infiltration of the mucous membrane is succeeded by patches of firmer tissue, with afterwards papillomatous or sessile tumours in either of which ulceration ultimately sets in. Bilharziosis is usually associated only with the bladder, and the recurrent hæmaturia during a period of years in persons coming from a district where the disease is endemic, makes the diagnosis an easy one, and repeated examination discovers the typical ova. Though the bladder is usually affected the bowel and even the urethra may be the habitation of the parasite. The case reported by May is perhaps a unique one, for he describes it as "a papillary growth in the gastric mucous membrane, which contained large numbers of more or less typical terminal spiked Bilharzia ova" Madden on the other hand writes, "ova have been found in the muscular wall of the stomach, the condition being latterly verified post-mortem (Goebel) but not in the mucous membrane, and Bilharzial manifestations may be found in any part of the mucous membrane of the intestinal tract from the ileum to the anus." The term "Bilharzial Dysentery" emphasizes the most troublesome subjective symptom which is constantly present in the intestinal affection.

This case, instructive to surgeons at home, is doubly interesting to the Army Medical officers, for theirs is the opportunity of meeting first hand, men from infested districts, and of investigating in the districts themselves the various manifestations of this troublesome affection.

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SURGICAL NOTES.

BY MAJOR H. V. PRYNNE.

Royal Army Medical Corps.

THE following notes of surgical cases may contain matters of interest.

Private A. was admitted to hospital with a history of having struck his head while diving into shallow water. He was unconscious when taken from the water, and was transferred to hospital the following morning, as his condition at the time of the accident was judged to be too serious for him to be moved.

On admission the temperature was 104·2, pulse 80, respiration 20, and the patient had quite regained consciousness. Complete paralysis of both legs with paresis of the right arm, and retention of urine were present, but the bowels had not been moved. No irregularity of the spinous processes could be felt, nor was there any evidence of fracture or dislocation, though pain in the neck was complained of.

A skiagram showed a faint shadow opposite the interval between sixth and seventh cervical vertebræ, suggestive of a spicule of bone. The clinical symptoms, however, were more consistent with intra-medullary hæmorrhage, and so laminectomy was not indicated.

The patient died from the extension of the damage upwards to the roots of the phrenic nerve, causing death from respiratory failure.

The autopsy showed bilateral hæmorrhage into the substance of the spinal cord at the level of the sixth and seventh cervical vertebræ. No detached spicule of bone was found.

Private H. was admitted with an injury to his elbow, which was extremely swollen, so that the relation of the various bony points was obscured. A skiagram revealed no bony lesion. As the swelling subsided the pain and tenderness became localized round the inner condyle, and limitation of movement persisted.

A second skiagram showed ossifying periostitis round the inner condyle of the humerus, evidently implicating the ulnar nerve and causing anæsthesia and numbness.

A vertical incision over the back of the joint gave access to the callus which was gouged away, carefully avoiding any interference with the ulnar nerve.

The patient regained complete voluntary movement in the joint.

Private L. was admitted with a history of acute pain in the left side after lifting a heavy box, and this was followed by bilious vomiting. Tenderness was present below the costal margin on the left side, and after admission the patient developed irregular temperature with marked constitutional signs, and the urine was found to contain pus and blood.

Dullness and extensive swelling now developed in the left flank, the temperature became hectic, and the patient very ill.

He was taken to the operating room, but refused to allow anything to be done.

Subsequently a copious pyuria supervened and all physical signs and symptoms disappeared.

No calculus was ever seen in the motions, and skiagrams were negative, so that the position of the abscess was never determined, but the history suggests a calculous pyelitis rather than a perinephric abscess.

Private S. was admitted with a severe wound of the neck, which he had inflicted with a razor. The thyroid gland was wounded, and bleeding was consequently severe, while the division of the endo-thyroid membrane gave rise to some surgical emphysema. The severed tissues were carefully united and the patient kept with his feet elevated and head low, while creosote inhalations were frequently used and oral sepsis constantly combated. The air was kept moist by a bronchitis kettle. Similar lines of treatment were followed in a case of a cut throat with division of the thyro-hyoid membrane. No septic lung complications occurred in either case.

Private N. was admitted for a swelling involving the skin of the middle of the thigh, which he had first noticed two months before admission. The growth was nodular on the surface and at the margin slightly raised above the level of the skin, which was somewhat thinned and discoloured. The growth was freely removed, and reported to be non-tubercular on microscopical examination.

The operation area was subsequently skin-grafted, but without success owing to suppuration. The area from which the grafts were taken also failed to heal. The inguinal glands on the same side as the new growth subsequently swelled and finally broke down. A positive reaction with von Pirquet's tuberculin was now obtained. The disintegrated glands were freely removed, but the edges of the operation wound became studded with suppurating tubercles. The entire infiltrated area was excised and the patient invalided to England for change.

Staff-Serjeant L. was admitted with a firm swelling of the breast, adherent to the skin, but freely movable over the underlying structures. The nipple was somewhat retracted but no enlargement of the axillary or supra-clavicular glands was present. The growth was first noticed six weeks before admission, and gave rise to discomfort when the braces pressed on the swelling. The breast was removed together with the subjacent pectoral fascia, while at the same time the axillary glands were examined for enlargement, but none found.

The growth was found on microscopical examination to be a scirrhous carcinoma, with a very large preponderance of fibrous tissue and very few cells. Six months later there was no evidence of recurrence.

Gunner H. was admitted with a large fluid swelling beneath the sterno-mastoid muscle, extending from the upper level of the thyroid cartilage to a short distance above the clavicle. The fibres of the sterno-mastoid muscle were separated throughout the whole extent of the swelling, and a cystic hygroma removed whole. Though cysts of this nature tend to disappear in time, in this case the swelling interfered with the man buttoning his uniform collar.

Private H. was transferred with a history of infective osteo-myelitis of the tibia, following a kick from a horse. On admission there were one or two sinuses, which on examination were found to lead down to dead bone. Through a long incision three large sequestra were removed and the diseased bone gouged away. The cavity left after the operation extended from the junction of the middle and lower third of the tibia to the head of the bone, being only separated from the knee-joint by a thin layer of bone. The patient made an excellent recovery and returned to duty.

Gunner L. was admitted with tenderness and pain over the mastoid process. No pyrexia was present on admission, but aural discharge had been in existence for some weeks. Facial paralysis developed and at the same time the temperature commenced to show an evening rise. A complete mastoid operation was performed and the patient returned to his duty, though his hearing was somewhat impaired.

Sapper M. was admitted with pain in the left thigh, in the course of the sciatic nerve, with impaired movement of the hip-joint. After admission the temperature gradually rose and became hectic in character, whilst pains developed in the wrists and elbows, which became red and tender. There was no urethral discharge, and no focus of suppuration to be found. Finally a large gluteal abscess became evident, and after this was incised and well drained the septic condition of the joints disappeared.

Serjeant M. was admitted with a history of pain in the right iliac fossa for three days. The temperature was 102·8° F., pulse 120, respirations 40. There was tenderness under the right costal margin, but none over the iliac fossa. The patient had suffered from cough for three weeks, and on examination râles were present at the right base. The sputum was purulent, but contained no tubercle bacilli. Friction sounds were subsequently audible at the right base, while the pain was referred to the left base where friction and moist râles were also heard. Aspiration on both sides proved negative, but the sputum gradually diminished and the physical signs disappeared. The case on admission somewhat suggested appendix trouble, but the rapidity of the respirations gave a clue to the site of the mischief.

A. B., a civilian in the employment of an officer, reported sick, complaining of pain in the left iliac fossa, which he stated commenced two days before whilst he was digging, and which he also stated came on each time he took any food.

On examination a small, hard, tender lump was felt in the left iliac region, situated immediately above Poupart's ligament. No vomiting had occurred, but the patient suffered from constipation of old standing.

He was examined in his own house under anæsthesia, but no diagnosis could be made. As he was a civilian and not entitled to treatment in a military hospital, he was admitted to the Seaman's Hospital, Greenwich, under Mr. William Turner. Here the diagnosis was considered very doubtful, but lay between suppurative perisigmoiditis following stercoral ulceration, or tuberculous gland or abscess, as the patient gave a positive von Pirquet reaction.

The case was watched for a fortnight, during which time vaccines were employed without much effect, a sigmoidoscopic examination was also made, but nc signs of ulceration found. Laparotomy was accordingly performed, and a hard swelling found in the sigmoid meso-colon involving the wall of the bowel. A portion of this growth was excised and at once examined microscopically; it consisted of small round cells, being of the nature of a gumma, tubercle or sarcoma. As the growth could not be definitely pronounced free from malignancy, and was clearly not inflammatory, the affected parts, including a length of intestine, were freely removed, and the cut ends of the bowel directly sutured. The man made an excellent recovery.

Mrs. W., wife of a cadet's servant at the Royal Military Academy, aged 59. While I was on leave this woman had signs of consolidation of the base of the left lung, unaccompanied by fever, and resolution was delayed.

On taking over the case moist sounds were present, and some impairment of resonance. Later there was an increase in the amount of the expectoration, which also became more purulent in character. The patient stated that something seemed to pass from below her ribs towards her chest. Repeated examinations for tubercle bacilli proved negative. After the illness had lasted six weeks or two months she, on one occasion, complained of abdominal pain, and dullness was discovered in the left subcostal region.

The opinion of another medical officer was obtained, but he was unable to confirm the existence of the dullness, and considered the case to be one of bronchiectasis or fibroid phthisis. The case showed no improvement under a course of creosote inhalations.

From this date the expectoration varied in amount, containing pus cells and cocci, but a month later a swelling again manifested itself in the left loin, and its appearance coincided with a marked diminution in the quantity of expectoration.

This swelling had disappeared by the evening, when she was seen in consultation with the medical officer who had charge of the case originally, but an examination of the urine revealed the presence of copious pus with some blood.

The subsequent course of the case was rapidly downhill; partial suppression of urine supervened, and patient developed the restlessness and coma of uræmia, so that operation became impossible, and the case ended fatally.

The case was no doubt one of subphrenic abscess, and it appears most likely that the disease commenced below the diaphragm, and formed first a secondary empyema, and finally found its way into the pelvis of the kidney. Had the case been one of primary empyema, some degree of pyrexia would have been probable, and as expectoration was immensely copious at one period, would probably have produced definite signs, whereas these were not at any time very marked. Lastly, the woman's history of something passing from the abdomen towards the chest might be of a certain value.

The following cases of appendicitis show the impossibility of accurately diagnosing the pathological condition present during any attack.

Gentleman Cadet B. was admitted with abdominal pain and some tenderness over the right iliac fossa, which had commenced a few hours earlier after an attack of vomiting. The temperature was 97·8° F. on admission, in the evening it had risen to 100° F., and reached the same level on the two succeeding evenings, after which it became normal. The pulse-rate did not exceed 80 on any occasion, and no abdominal rigidity was present at any time. Tenderness persisted over the iliac region for some days, and the patient was operated upon at his own home by Mr. McAdam Eccles, who found the appendix full of active and living threadworms.

Gentleman Cadet D. was admitted with abdominal pain, which he stated was due to a "bilious attack," from which he often suffered. There was very slight tenderness on pressure over the right iliac fossa, and palpation caused muscular contraction in this region. The temperature was 99·4° F. on admission, but became normal the same day, and remained at this level afterwards. The pulse-rate never exceeded 72.

Tenderness persisted, but the patient obstinately maintained that his attack was due to biliousness. The specialist whom the parents asked to see the case with me, confirmed the diagnosis, and appendectomy was subsequently performed at the Queen Alexandra Military Hospital.

Gentleman Cadet E. was admitted at 9.30 one evening complaining of epigastric pain attributed to drinking a quantity of iced mineral water the preceding day. Patient had vomited once, and on admission the temperature was 97·8° F., and the pulse 60. No abdominal rigidity or tenderness were present.

The next morning the temperature was 98·4° F., and pulse 66; abdominal pain was stated to be less, and no iliac tenderness or rigidity present. The same evening the temperature had risen to 98·8° F., with a pulse-rate of 72, but slight uneasiness was present on pressure over the right iliac region.

The patient had a restless night, with a return of pain, which was severe in character, and at 7.15 the following morning the temperature was 99·2° F., and pulse-rate 88. There was marked rigidity over the right iliac fossa, and the abdominal wall moved badly. The general appearance of the patient was anxious.

An urgent message was sent to Lieutenant-Colonel Wilson, R.A.M.C., the Officer-in-Charge, Surgical Division, Royal Herbert Hospital, with a view to his immediate removal to hospital for operation. Lieutenant-Colonel Wilson saw the case at once, and operated directly he reached the hospital.

The condition was found to be one of commencing general peritonitis from a gangrenous appendix.

Such a case furnishes the very strongest argument for operating on all cases of appendicitis within the first twenty-four hours of the illness, as it is quite impossible to foresee the course of even those cases which at the outset appear most mild.

THE CONVEYANCE OF WOUNDED IN CANAL BARGES.

By Lieutenant-Colonel R. JACKSON.
3rd West Lancashire Field Ambulance, Royal Army Medical Corps, T.F.

A barge can easily and rapidly (in half an hour) be made suitable for the sick and wounded by the following arrangement:—

A pole or plank of suitable width is carried amidships, supported on the cross irons of the barge, another being nailed along the gunwale, so that the distance between these two is 6 ft. The stretchers are placed on each side of the centre plank with the handles resting on it and the gunwales, with the rollers between them, so preventing any movement.

Between each pair of stretchers an interval is left, 18 in. to 2 ft. wide. This arrangement allows an attendant to walk along the boat under the stretchers, and to give any assistance alongside any one of the patients.

A ridge pole is supported at a convenient height to carry an awning. Each barge has a cabin which could be used for the storage of medical comforts, dressings, &c.

A 50-ton barge arranged like this is capable of carrying thirty-six lying down patients, with accommodation for twenty others on the floor of the boat, a total of fifty-six lying-down patients. By placing planks across the boat it is capable of accommodating 300 sitting up cases. Canal barges can be arranged to accommodate both classes of cases at once, e.g., forty lying down cases and fifty sitting up.

This method of transport for sick and wounded would be of great value. It is very comfortable for the patients, and they could receive every attention during the transit. It is also economical in horses, as one horse can tow the loaded barge at the rate of two miles per hour; it would also relieve the traffic on the roads.

Report.

SECOND EXPERIMENTAL MARCH TO INVESTIGATE THE AMOUNT OF FOOD REQUIRED BY MEN ON ACTIVE SERVICE.[1]

(1) The Second Experimental March commenced on August 17, 1910, the party being composed as follows:—2nd Lieutenant J. B. Taylor and twenty N.C.Os and men of the 1st Battalion Somersetshire Light Infantry.

Captain H. G. Dyer, Army Service Corps, and four N.C.O.s and men, Army Service Corps.

Serjeant-Major T. J. Tillbrook and three N.C.O.s and men of the Royal Army Medical Corps.

The following officers of the Royal Army Medical Corps also took part in the march for the purpose of observing the effect of the experiment, viz.: Lieutenant-Colonel C. H. Melville, Major W. W. O. Beveridge, D.S.O., and Captain N. Dunbar Walker.

The party all assembled at Willsworthy camp about two miles from Lydford, on the western border of Dartmoor, on the afternoon of the 16th, and work began on the morning of the 17th.

(2) As before the men were volunteers and were remunerated on the same scale as previously.

(3) The transport retained permanently with the party was also the same as on the previous occasion.

(4) The men of the Somersetshire Light Infantry were accommodated in four tents, each officer had a tent to himself, and additional tents were allotted for the Army Service Corps, Royal Army Medical Corps, and for hospital purposes, and as an officers' mess tent. Tent boards were available and used in all tents. Straw was not issued.

(5) The officers and men of the Somersetshire Light Infantry and of the Royal Army Medical Corps were weighed and measured (circumference of the chest, abdomen at navel, and of the right calf) at 8 a.m. on the 17th, and the former process was carried out every day at the same hour throughout the progress of the experiment. The measurements were repeated on the 20th, 23rd, 26th, and 29th. The final weighing was made on the morning of the 30th, after which the detachment of the Somersetshire Light Infantry marched to Lydford Station, *en route* for Portland and Dorchester, accompanied by the officers and the men of the Royal Army Medical Corps, with the exception of one of the

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[1] Under the supervision of the Research Committee—Hygienic Section, Army Medical Advisory Board.

latter who, together with Captain Dyer and the men of the Army Service Corps, remained to wind up the packing of the tents, &c., and secure their removal to Devonport. No move was made during the experiment, Camp Willsworthy being occupied throughout. This was done because standing latrines, cooking shelters, and drying sheds were available at that spot, and not elsewhere. Any change of ground would have caused great inconvenience and expense, and did not seem called for in the interests of the experiment.

(6) The men were weighed, as on the first occasion, in trousers, drawers and socks, and for this purpose one of the drying sheds was utilized. This was a great advantage in view of the inclement weather and the constantly prevailing high wind, a factor which on the last occasion distinctly hampered the process of weighing. The men were weighed in full marching order on the 17th and 24th, the mean of these two weights being used as the basis for calculation of the total external work performed on the march. It may be mentioned that the abdominal girth was taken with the man in the supine position; this method removes any fallacy due to lax abdominal walls. In order to eliminate any variation attributable to the personal factor all measurements were made by Captain Walker. Details of weights and measurements are shown in Appendix II.

(7) The daily weighing took place at 8 a.m. and immediately thereafter the men dressed and paraded for the day's march. Owing to the condition of the ground it was necessary to limit the marches to the few roads available; this has to a certain extent simplified the labour of calculating the distances traversed and the heights climbed. These were recorded very carefully on 6-in. ordnance maps as soon as possible after performance, by Lieutenant-Colonel Melville, Captain Walker and Lieutenant Taylor. The diary of the marches, &c., is given in Appendix I. The weather conditions were, if possible, worse on this occasion than in 1909. Rain fell at some time on every day, and almost continuously for the last three days of the experiment. The temperature was abnormally low for the time of the year, and the wind blew hard all the fortnight from the south and west. The camp site is absolutely unsheltered, and the soil being of a peaty nature the persistent rain turned it into a thick sludge wherever it was exposed to much traffic. Elsewhere the heather held the water in pools, and for the last ninety-six hours it was impossible to leave the tents and remain dry shod.

(8) The behaviour of the men composing the party was excellent, and the conditions of the experiment were loyally observed by all.

(9) The health of the entire party was excellent. Towards the close of the experiment one or two men complained of diarrhœa, probably the result of the chill, but never to such an extent as to prevent their taking part in the daily march.

(10) The men of the Somersetshire Light Infantry carried the Web

equipment, 1908 pattern, but without ammunition. The total dead weight averaged 42 lb. 8 oz. The average weight carried by the men of the Royal Army Medical Corps was about 25 lb. Captain Walker carried the same weight as the men of the Somersetshire Light Infantry, while Lieutenant Taylor carried 25·3 lb., and Major Beveridge 21 lb.

(11) Detailed accounts of the rations issued will be found in Appendix III. It will be noted at once that there was a considerable advance on the rations issued during the march of 1909. This consisted chiefly in the issue of bacon, cheese, and oatmeal, 2 oz. of each, in addition to the articles previously given. The tea ration was at the same time raised from ½ oz. to ⅝ oz., the sugar from 2 oz. to 2¼ oz., and the jam converted from a nominal to an actual weight. The average weight of the tins of jam issued may be taken at 1 lb. 4 oz., so that for purposes of calculating the gross weight of the rations per man the daily allowance should be taken at 5 instead of 4 oz. At the same time the issue of potatoes and fresh vegetables was theoretically cancelled, the idea being that these should be given only as a luxury when available. As a matter of fact, cauliflowers, cabbage, and carrots were given in the first four days of the first week, and onions in the corresponding part of the second week. A new issue of 1 oz. of pickles was also made during the time that corned beef was given to the party. The various foodstuffs will now be discussed separately.

(12) *Beef, Bacon, and Cheese.*—As on the first march, preserved meat was issued during the first week, and fresh meat during the second. During the first four days of each week the full ration of meat (viz., 1 lb. nominal of preserved meat, and 1¼ lb. of fresh meat) was given, and during the next three days these quantities were reduced by ¼ lb. each, substitutes being provided. The substitute during the first week was ¼ lb. of bacon, and during the second week 2 oz. of cheese. The fixed ration of bacon and of cheese was 2 oz. throughout the entire period. Thus during the first four days of the first week each man was receiving 1 lb. nominal (12 oz. actual) of corned beef, plus 2 oz. bacon and 2 oz. of cheese. During the next three days ¾ lb. nominal (9 oz. actual) of corned beef, plus 6 oz. bacon and 2 oz. of cheese. During the first four days of the second week 1¼ lb. of fresh meat (or 16 oz. deducting bone), plus 2 oz. of bacon and 2 oz. of cheese, and during the last three days of the experiment 1 lb. of fresh meat (say 13 oz. without bone), 2 oz. bacon, and 4 oz. cheese. Thus in the first period the food eaten under this heading amounted to 16 oz., during the second to 17 oz., in the third to 20 oz., and in the fourth to 19 oz. As regards the nature of the substitute used there can be no doubt that bacon is by far the most satisfactory. Six ounces of bacon are not at all too much for a hungry man, and the fat is much appreciated, both as an article of diet and as a culinary accessory. Cheese does not possess the latter valuable quality, and 4 oz. is a large amount of so concentrated a foodstuff. On the question of policy it is

perhaps inadvisable to use a substitute article in less quantity than the original which it replaces. To the ordinary man, 4 oz. of food are 4 oz., and he is not always content to accept the dictum that under certain conditions 2 oz. are just as sustaining. The corned beef was of good quality (Armour and Co.'s "Veribest") and on the whole rather better than that issued last year. The fresh meat was excellent.

In estimating its value the same figures have been made use of as in the previous report (viz.: Attwater and Bryant "side of beef, medium fat, as purchased"). The bacon was excellent but contained a rather large proportion of fat, a fault, however, on the right side. The cheese was Canadian Cheddar of very good quality. These two new issues were very much appreciated by all who had taken part in the first march. The bacon at breakfast and the cheese at the midday halt broke the monotony of perpetual corned beef at every meal.

(13) *Bread, Biscuit, Oatmeal, and Peas.*—These substances may be considered together as furnishing the starchy portion of the ration. With regard to biscuit and bread a somewhat similar procedure was adopted as in the case of meat. Thus in the first four days of each week the full ration of 1 lb. biscuit or 1¼ lb. bread was given. During the succeeding three days ¼ lb. of each was deducted and 4 oz. of oatmeal substituted. As last year the biscuit ration was found to be too large for the officers (with the exception of Lieutenant Taylor), but not for the men. In marked contrast to last year the officers found the bread ration excessive, and a good deal was left unconsumed. This was undoubtedly due to the presence of a liberal allowance of carbohydrate food of a starchy nature in the regular ration of oatmeal.

The oatmeal ration consisted of 2 oz. during the first four days and 4 oz. during the last three days of each week. This latter issue was given in lieu, as already stated, of 4 oz. of bread or biscuit. Since if, in addition to this "substitute" ration of 4 oz., the original ration of 2 oz. had also been continued, the resulting total of 6 oz. obviously would have been excessive, 2 oz. of dried peas were issued during the last three days of each week instead of the original 2 oz. of oatmeal. It was generally agreed that 4 oz. of oatmeal was too large a ration for a continuance, though for a few days it was acceptable enough. The dried peas were much appreciated. Their only drawback is the prolonged soaking necessary to prepare them for cooking. It was noticed occasionally that peas passed through the alimentary canal practically unaltered. This would rather prejudice their use under the very ordinary conditions of field service; the difficulty might be easily minimized by grating or pounding.

(14) The vegetable ration consisted of 8 oz. fresh or 2 oz. dried vegetables. The former was given during the first four days of each week, the latter during the remaining three days. The energy value of these issues has been included in the "profit and loss" calculations, referring to the total food consumed and the total work done on the

march (*see* Appendix IV). Since, however, it is not intended that fresh vegetables should be carried on active service (*see* reference on this point in para. 47 of report on First Experimental March), the weight of these has not been included in the "weight for transport" calculations given in Appendix III. The fresh vegetables consisted of cauliflowers, cabbage, and carrots during the first week, and of onions during the second. It may be noted that 8 oz. of onions is a very considerable amount of this vegetable and probably rather more than most people appreciate. The dried vegetables consisted of excellent chip potatoes, which possess, of course, a very considerable energy value for their weight.

(15) The ration of jam was issued in tins containing 1 lb. of jam. The actual weight of the ration per man therefore works out at about 5 oz. for transport. The jams issued were strawberry, gooseberry, and apricot; all were of excellent quality.

(16) The sugar, salt and tea were issued in bulk, and weighed out separately. The sugar and tea were increased from 2 oz. to 2¼ oz., and from ½ oz. to ⅝ oz. respectively. They were of good quality, but the sugar was white instead of moist, as last year. The salt deliquesced very rapidly in the damp air. This is due to the presence of magnesium chloride, an unnecessary ingredient. On service this property, which is easily avoidable, would be a serious defect if the salt were carried in the haversack. Mustard and pickles were a new issue. The latter were not greatly appreciated but would, it is probable, be more so under service conditions, where the fresh meat would be apt to be tasteless. The amount of mustard given ($\frac{1}{20}$ oz.) was sufficient. With this article, too, there would be some difficulty in issuing on service. It is possible that the solution of this difficulty, as well as of that connected with the salt issue might be met by the construction of "tabloids." The pickle issue of 1 oz. was generally considered too large, probably ½ oz. would be sufficient. The quality was excellent.

(17) The men smoked but little. Fortunately, they were apparently under the misapprehension that smoking was not allowed and, therefore, came unprovided with cigarettes, a *lacuna* that luckily the position of the camp put it out of their power to fill. There was no restriction placed on smoking. Rum was issued on four occasions. This was considered advisable owing to the fact that in spite of the use of the drying shed, the men were never able to get positively dry clothes. The same might be said in fact of the officers.

(18) The amount of protein provided daily was as follows:—

During the first four days, 210 grm. (7·41 oz.).

On the last three days of the first week, 202 grm. (7·13 oz.).

Average of the first week therefore, 207 grm. (7·30 oz.).

On the first four days of the second week, 170 grm. (6·00 oz.).

On the last three days, 183 grm. (6·45 oz.).

Average of second week, 176 grm. (6·21 oz.).

These figures are undoubtedly high, but there was no evidence that they were too high. As a matter of fact, the rations of the first week were on the whole preferred to those of the second week. It may be said with safety that as far as personal tastes go the form in which protein is given is far more important than its absolute quantity. Here cooking comes to have great weight. Protein food cooked by itself is rarely palatable. It needs the addition of a fat, and the exhibition of a certain amount of culinary skill. The fact that fat was available during the first week made all the difference, as far at least as the officers were concerned, in the amount of corned beef that they were able to consume. The possession of a mincing machine also helped to disguise the place of origin of the meat, and the distaste that was acquired for corned beef by the end of the first week of the march of 1909 was conspicuously absent on this occasion. As already stated, the cheese ration was generally considered too high in the latter part of the second week, but this was not due to any absolute excess of protein. The conclusion arrived at by the medical officers who took part in both experiments was that the best ration of protein for service is in the neighbourhood of 200 grm., and that with moderately good cooking such an amount can be easily ingested even when about half is provided in the form of preserved meat.

Observations are in process of being made to elucidate the question of the nitrogenous balance in the case of the three medical officers who shared in the experiment, but these will take considerable time to complete and are besides of so technical a character that it is not thought desirable to include them in this report. The results obtained may, however, be of value in discussing the question of the effects of the march on the men.

(19) The average amount of fat issued daily was as follows:—
During the first four days, 113 grm. (3·98 oz.).
During the next three days, 181 grm. (6·38) oz.).
Average of the first week, therefore, 142 grm. (5·01 oz.).
During the first four days of the second week, 174 grm. (6·14 oz.).
During the last three days, 177 grm. (6·24 oz.).
Average of the second week, 175 grm (6 17 oz.).

During the first week of the 1909 march the fat ration was only 50 grm., and during the second 110 grm. The increase in the amount supplied of this particular principle is in fact the distinguishing point about the march of 1910. The figures are certainly large, but there was not the slightest doubt in the minds of the officers taking part in the experiment that the allowance of fat was not excessive. More was not wanted, but more could have been taken, except perhaps in the last three days of the first week. Even during that period, however, the ration was not considered excessive in this direction, and in fact it may be stated that taking it as a whole the ration of this particular period was considered the best of the four scales issued. As already stated, the fat was appreciated not only as a food in itself but also as a culinary adjunct in the preparation of other foods.

(20) *Carbohydrates.*—The amount of carbohydrate issued daily was as follows:—

During the first four days, 565 grm. (19·94 oz.).
During the next three days, 576 grm. (20·33 oz.).
Average for the first week, 570 grm. (20·12 oz.).
During the last three days, 548 grm. (19·34 oz.).
Average the second week, 529 grm. (18·67 oz.).

The above amounts show a marked advance on those issued during the 1909 march. In that case the average during the first week was 505, and during the second, 450. The increase is mainly in the direction of starchy foods. The sugar was, it is true, increased from 2 to 2¼ oz., and the jam from 4 oz. nominal to 4 oz. actual, but the really important additions were those of 2 oz. oatmeal and 2 oz. peas. As regards the men, the entire ration was consumed, but in the case of the officers (with the exception of Lieutenant Taylor, the youngest) there was a distinct surplus of starchy foods. No increase in these amounts of starchy foods would be advisable, even if more energy were required. Any advance in carbohydrates would need to be in the allowance of sugar or jam. The ratio of fats to carbohydrates was as 1 to 5 and 1 to 3¼ in the two periods of the first week, and as 1 to 2⅝ and 1 to 3⅐ in those of the second week. The highest ratio of fat to carbohydrate in the 1909 march was as 1 to 4½. The change is distinctly in the right direction. The craving for extra sugar was not felt so generally as on the last occasion. This was probably due to the large amount of fat available. When present it appeared to coincide with a disinclination to take the starchy foodstuffs.

(21) The total energy furnished daily by the various scales was as follows:—

During the first four days, 4,232 calories.
During the next three days, 4,877 calories.
During the first four days of the second week, 4,418 calories.
During the last three days 4,645 calories.
The average for the first week was therefore 4,508 calories.
The average for the second week was 4,515 calories.
The average for the whole period was 4,511 calories.

A statement has been prepared (Appendix III) showing the comparative energy values and weights for transport of the rations issued in 1909 and 1910. In estimating these, the values of the really important articles only have been included, comparatively trivial sources of energy such as tea, mustard, and pickles being omitted. In the 1910 rations the weights and the values of the vegetable ration have also been left out, since in theory these would not have been supplied when on the move. The net result is that with the corned beef and biscuit issue there has been a fractional increase of about ½ oz. in weight, whilst there has been an increase of energy value from 3,292 to 4,378 calories, equivalent to 33 per cent. When fresh meat and bread were issued, there was an actual decrease in average weight of rather over an ounce in 1910 as compared with 1909, accompanied by an increase in energy value from 3,444 to 4,316 calories, equivalent to 25 per cent.

These are gross values. The average amount is close upon Attwater's standard for hard work (4,500 calories), and well above the "hard labour" scale for convicts in England (4,161). It is very nearly 1,000 calories in excess of the ration issued on the march of 1909.

(22) The experience of all the three medical officers who took part in both marches was that the ration as issued on the occasion under discussion at present was infinitely better, both as regards quantity and composition, than that supplied last year. The improvement as regards quantity was chiefly noted in the fat supplied in the bacon and cheese, and the bulk furnished by the porridge. None of the officers experienced the craving for fat which was such a very marked feature of the first experimental march. In marked contradistinction to that occasion, they unanimously agreed that they were getting as much to eat as they needed, and, indeed, in the direction of starchy foods more than they could conveniently digest. The men ate all their food, but Serjeant-Major Tillbrook, a man older, of course, than the average, was unable to eat all his biscuits. Some of the men complained of the bacon being too fat, but probably this was a matter of cooking.

As regards different articles, it may be of interest to note the following opinions expressed by the men. The sugar was considered sufficient by most, though a few would have liked more, but no one considered it excessive in amount. The same remarks apply to jam, two men only wanting an increase. With regard to cheese, there was a general consensus of opinion that the allowance of 4 oz. issued during the last three days was excessive. Two ounces seem to be the best ration of this substance. No men complained of having too much bacon, even with the high issue of 6 oz. given during the last three days of the first week. On the other hand, several men considered the 2 oz. ration insufficient. The pickles were not appreciated. There is one objection to their use which has not perhaps been sufficiently appreciated, namely, that it would not be safe to carry them in the present mess tin, since the acetic acid present might take up lead from the solder. It is worthy of remark that, almost without exception, the corned beef and biscuit ration was preferred to the fresh meat and bread issue. As regards the preference of biscuit to bread, this is only a repetition of last year's experience. The reverse is, however, the case with the meat ration. In 1909 fresh meat was preferred. The most probable explanation is that last year there was practically no fat with the corn-beef issue, whereas this year bacon was issued. On the question of the whole ration there was an unanimous expression of opinion from the men that they had enough to eat. The general impression under which the men volunteered was that the object of the experiment was to ascertain the minimum amount of food on which they could be kept alive, and they were agreeably surprised to find that they got as much if not more food than they were accustomed to in barracks. At the conclusion of the experiment, a considerable number expressed regret that it was not going to extend over another fortnight. Statements of opinion by Captain Dyer and Lieutenant Taylor are embodied in full in Appendix IV. In comparing opinions of officers and men it must be remembered that the latter were carrying heavier loads than the former; the difference in the dietetic customs of different social classes must also be kept in mind.

The appearance of the men at the close of the experiment was strikingly different from that of the party which took part in last year's march. No man showed any signs of wasting; cheeks were not hollowed, nor did the eyes show the sunken appearance so noticeable in many cases on the first occasion.

(23) The details of the marches, halts, &c., are given in Appendix I, and the equivalent of the total work done in Appendix V. The latter has been calculated on the same manner as in the case of the first march. As regards internal work, a different figure has however, been adopted. The conditions of camp life at Willsworthy were not so arduous in some respects as on Salisbury Plain. The camp had never to be shifted, so that the only fatigues demanded of the party were the initial pitching and final striking and packing of the camp. The latrines and kitchen were also more accessible than at West Down. For the two days on which no march was made the figure given by Zuntz ("Physiologie des Menschen," Zuntz and Loewy, 1909, page 701) for the ordinary non-working day of an infantry soldier, viz., 3,000 calories, has been taken. For all other days a figure lying half-way between the above, and that given by the same authorities for a purely sedentary life in one room, viz., 2,550 calories, has been taken. This amounts to 2,750 calories.

(24) The external work done on the march was greater on this than on the first march. The average length of march in the 1909 experiment was about 12½ miles, as compared with 14¾ miles on the present occasion. In addition, the roads were considerably more hilly. Thus on Salisbury Plain the average ratio of ascent to level was 1 to 99, on Dartmoor it was as 1 to 59. On the other hand the "going" was distinctly better in the latter locality. This was due to the fact that owing to the sodden condition of the moors it was necessary to keep to the main roads between Tavistock on the south and Okehampton on the north. The total external work per man performed on the present occasion was 15,616 calories, giving an average per marching day of 1,419 calories. In 1909 the corresponding figures were 12,407 and 1,034 calories. The preponderance in favour of the present second experiment would have been even greater if it had not been for the unfortunate fact that the weather on August 28 was so bad that a

compulsory rest had to be given to the men. The total work, external and internal, performed was about the same on both occasions, viz., 4,033 calories per man per day in 1909, and 3,989 in 1910.

(25) *Weights of the Men.*—The detachment of the Somersetshire Light Infantry was of the same strength as that of the Loyal North Lancashire Regiment which was out in 1909. The average weight was almost identical—64·1 kg., as against 64·15—and the age, service, &c., of the two parties were such as to make them suitable for comparison. The figures of the officers are given separately, and also those of the detachment of the Royal Army Medical Corps, for the reasons given in the last report. Amongst the officers, Captain Walker, who carried the same load as the rank and file of the Somersetshire Light Infantry, and Lieutenant Taylor, who was about the same average age as the average of his men, furnish the most useful figures for comparison with those of the men. Captain Walker, Corporal Dady, and Private Durrant are also useful for comparison with last year, since they performed similar work on both occasions.

(26) The figures are given in Tables I, II and III, Appendix II. As last year, the most striking figure of the curve is the initial rise in weight followed by a distinct fall. Taking the rise first, it will be noted that this was more marked on the present occasion than the former. Starting from an initial average weight of 64·1 kg. we find on the second day one of 64·6, followed by 64·75, 64·8 and 64·87 on the three days following. Last year the rise lasted three days only, the fourth showing a slight drop, with a recovery on the fifth day. On the present occasion there was a drop on the sixth day, so that the average weights on these days were practically the same on both marches. On the first march there was practically a continuous fall after the sixth day, but this year the high level attained was kept up till the eighth. It may be said, in fact, that the initial rise was better marked, greater in extent, and sustained longer than in 1909; seventeen out of the twenty men forming the party showed this rise, in three it was not well marked. In one of these, Serjeant Cayford, a man above the average in age, and of slight wiry build, there was a marked fall during the first three days, followed by a recovery to about his original weight on the seventh day. The average maximum was attained on the fifth day, but actually the summit of the initial rise was attained by a larger number of men on the fourth than on any other day. This happened in the case of two men on the third day and four men on the fifth. The average curve showed two peaks, a second high weight being returned on the eighth day. This double rise was fairly widely spread, occurring in the case of seven men of the twenty, of whom four showed it on the eighth day, two on the seventh, and one on the ninth. In the majority there was little difference between the weights on the two highest days, but in one man the weight was distinctly higher on the first than the second occasion, and in another the

reverse occurred. In nine men the weight curve showed only one peak, and these as a rule attained their maximum later than the others. The above facts may be summarized in the statement that in the great majority of the men there was an initial rise in weight extending over the whole of the first week and into the first day of the second week, the greater part of which was due to a rise in the first three days of the experiment. As in 1909, the rations issued during the first week contained corned beef and biscuit, instead of fresh meat and bread, which replaced them in the second week. The cause of the rise may, therefore, possibly be connected with the ingestion of nitrate of potassium and an increased retention of water in the tissues as was suggested previously. It is hoped that a direct experiment on this point may be carried out during the course of the winter. The investigation of the nitrogenous balance of the officers during this period may also throw some light on this question. The initial rise was not quite so well marked, however, in the case of the officers. Lieutenant-Colonel Melville and Lieutenant Taylor showed it fairly well, though in both the rise was interrupted by a marked fall on the fourth and fifth days respectively. The former officer attained his maximum on the sixth, the latter on the eighth and ninth days. Major Beveridge and Captain Walker showed no early rise, the former remaining practically stationary and the latter falling at first, with only a slight recovery, but never to his initial weight, during the latter part of the first week.

(27) After the eighth day there was a very marked fall in the weights. The average weight on the ninth day was about 0·17 kg. lower than that on the eighth day, and the tenth day showed a great fall of nearly 0·75 kg. This fall was practically universal, only one man not being affected by it. Amongst the officers, Major Beveridge only escaped, and only Corporal Dady amongst the men of the Royal Army Medical Corps. This fall did not coincide with any change of diet, and the only explanation that can be put forward, tentatively, is that the night of the 24th-25th August, immediately preceding the weighing of the tenth day, was extremely boisterous. A high wind amounting to a full gale blew throughout the night, with incessant rain, broken only by violent squalls which made a great noise on the canvas. All the officers complained of having passed a disturbed night, except Major Beveridge. It is an interesting fact that almost everybody in camp slept badly on the night of the 29th-30th, though as a matter of fact that night was comparatively calm. In any case the want of rest was undoubted on that night and the morning weight on the 30th again showed a marked reduction. The weights on the 11th, 12th and 13th days showed a steady increase. The most obvious was that on the 13th. This was undoubtedly due to the fact that owing to the atrocious weather of the day previous (the 28th) it was impossible to perform a march. The men were therefore confined rigidly to their tents all day. The final weighing on the 30th showed a

fall as compared with that of the 29th, perhaps attributable to the disturbed night already alluded to. Omitting the extraordinary fall of the tenth day, and the equally extraordinary rise of the thirteenth, the weights seem to fall steadily after the eighth day, but end up rather above the starting point, the average being 64·27 as against the original weight of 64·11. If this sequence of events be compared with that of the last week of the march of 1909, the contrast is very marked. In that case there was a steady and almost uninterrupted fall from the maximum period, and certainly from the eighth day, till at length the final weight was 0·6 kg. below the starting point. Whatever be the explanation we have the following facts fairly clearly established: (1) An increased quantity of food ingested on the second march as compared with the first march. (2) An initial rise in both cases more marked, and more prolonged in the second than in the first. (3) A subsequent fall much less in extent in the second than the first experiment; and (4) a final weight rather above the starting point in the former and distinctly below it in the latter. Add to this the fact that on the lower diet the men were hungry and presented all the appearances of commencing starvation, whilst on the fuller diet they were not hungry and looked in good condition. The deduction seems undoubtedly safe that the work being practically the same, the demands made by it were insufficiently met in the one case and satisfactorily met in the other.

(28) The curves showing the variation in weight amongst the officers and the men of the Royal Army Medical Corps correspond fairly closely with those referring to the men of the Somersetshire Light Infantry. The most marked variance is shown on the second and third days, which record a diminution in weight in both cases. This is followed, however, by a marked rise is both curves, culminating on the 22nd (sixth day) in the case of the officers, and on the 24th (eighth day) in the case of the men of the Royal Army Medical Corps. In both curves the double rise already referred to in the case of the men of the Somersetshire Light Infantry is well marked. What is of greater importance, however, is the marked fall in weight occurring during the first half of the second week which is common to all three curves. The ultimate rise in weight is well marked in the case of the officers, their curve being closely parallel to that for the Somersetshire Light Infantry. This is less marked in the case of the men of the Royal Army Medical Corps, but, nevertheless, these finish at a distinctly higher level than they started from. The officers on the whole show a slight fall of 0·4 kg. Lieutentant Taylor, however, increased in weight 1·7 kg.

(29) Returning to the Somersetshire Light Infantry, it is to be noted that thirteen men gained in weight during the first week, two men remained stationary, and five men lost. The greatest individual gain was that of Private Hodges, viz., 2·15 kg. equivalent to 3·58 per cent of his original body weight. The greatest loss was that of Private Cutting,

1·0 kg., or 1·31 per cent of his original weight. Of the men who lost, four were amongst the heaviest men in the detachment, being No. 1, 2, 3, and 5 in serial order of weight. The fifth was No. 11 in this order, and his loss was fractional, 0·16 per cent only of his original weight. The lighter men gained on the whole, but the extent of increase is not so closely dependent on their relative weight as in the above case. During the second week sixteen men lost weight, and four only gained. Of these last, two had lost rather heavily in the first week, and one remained stationary, the net result being that they finished the march very much where they began. The fourth man, Corporal Venn, was quite exceptional, gaining 1·4 kg. in the first week, 2·34 per cent of his body weight, and 0·6 kg. in the second week, 0·98 per cent. of his body weight; the ultimate total gain being 2·00 kg., or 3·32 per cent of his original body weight. This man was 16th in order of weight, and therefore a good deal below the average in this respect, to be precise, 4·25 kg. at the start, and 3·42 kg. at the close of the experiment. The general loss during the second week was, it seems probable, a reaction against the gain of the first week. This would point to the latter being to a considerable extent fictitious, due, that is, not to an actual increase in tissue, but to an enhanced retention of water in the system. On the whole period, 10 men gained in weight, 2 men remained stationary, and 8 men lost. That is to say, that, as in the case of the weight curve, there was a gain, but not a very great gain. There was definitely not a loss, as in the first march, when 15 men lost, and 5 only gained. On the whole the lighter men gained and the heavier men lost, but the figures are not nearly so closely correlated on the present as on the former occasion. Thus, if the men be arranged in serial order according to loss of weight (see Table IV.) and their serial numbers according to original weight be added together, it will be found that the aggregate of the first 10 when arranged in order of variation comes to 96, and that of the remainder to 114. Last year the corresponding figures were 69 and 140. This discrepancy is due to the fact that last year there was a marked and definite loss, this year a gain but not a marked or very definite one.

(30) As regards individual gain or loss of weight, it is interesting to note that one officer gained decidedly. This was Lieutenant Taylor, who was the youngest of the party, and as regards age the most closely comparable with the men. This officer gained in the first week 1·40 kg., and in the second 0·30 kg., being respectively 1·83, and 0·38 per cent. of the body weight. The total gain was in this case 2·21 per cent of the body weight. All the other officers lost. Major Beveridge and Lieutenant-Colonel Melville lost less than last year, but Captain Walker lost decidedly more. His loss in 1909 was only 1·86 per cent of his original body weight, whereas on this occasion it amounted to 2·67 per cent. Strangely enough this excess loss was not accompanied by any feeling of starvation, though this was markedly the case on the first march. This point is of decided

interest. It seems to show that actual loss of weight cannot be taken by itself as an isolated fact to prove underfeeding. The sensations and appearance of the individual must also be taken into account.

(31) The Men of the Royal Army Medical Corps showed on the whole a slight rise in weight. In the first week 2 increased, 1 lost and the 4th remained stationary. In the second week and over the whole period 2 gained and 2 lost, but the loss was greater than the gain. Comparing last year with this, Corporal Dady lost 2·39 per cent of his weight in 1909, and 0·74 per cent of his weight on the present occasion. Private Durrant lost 1·15 per cent in 1909, and gained 1·94 per cent this year.

(32) We may now consider the measurements. These were made on five occasions, viz., on August 17, 20, 23, 26 and 29, *i.e.*, the first, fourth, seventh, eleventh and thirteenth days of the experiment. Taking the chest first. On the fourth day, 15 men showed a gain, 3 a loss, and 2 no change. On the seventh day, 11 a gain, 8 a loss, and 1 no change; on the tenth, 7 a gain, 11 a loss, and 2 no change; and on the thirteenth, 9 a gain, 6 a loss, and 5 no change. Thus on the whole period 12 gained, 3 lost, and 5 remained stationary. Last year on the whole period 15 lost, 2 gained, and 1 remained stationary, whilst in 2 final figures were not recorded.

As regards the abdomen, on the fourth day 15 men showed a gain, 4 a loss, and 1 no change; on the seventh, 10 a gain, 9 a loss, and 1 no change; on the tenth, 4 showed a gain and 16 a loss; and on the last weighing, 13 a gain, 3 a loss, and 2 no change. Over the whole period, 13 gained, 5 lost, and 2 remained stationary. Last year, 7 gained, 10 lost, 1 remained stationary, and 2 were not recorded. As regards the calf, on the fourth day 7 showed a gain, 8 a loss, and 5 no change; on the seventh, 11 a gain, 5 a loss, and 4 no change; on the tenth, 2 a gain, 13 a loss, and 5 no change; and on the thirteenth, 15 a gain, 2 a loss, and 3 no change. Over the whole period 9 gained, 6 lost, and 5 remained stationary. Last year, 7 gained, 5 lost, and 6 remained stationary, and 2 were not recorded. On the whole, then, it may be stated that during the first four days of the experiment there was an increase in both chest and abdomen, whilst the calf remained stationary. In the next three days there was a slight increase in all three measurements. In the early part of the second week there was distinct loss in chest, abdomen and calf, followed by a recovery all round in the closing days of the experiment. Over the whole period there was a slight gain, amounting on the average to 0·5 of an inch in chest measurement, 0·3 of an inch in abdominal girth, and 0·05 of an inch in circumference of calf. Here as in the case of the weights we find an initial rise, a subsequent fall and a final rise. The two sets of facts fall therefore into as close an agreement as can be expected in the case of such a series of observations.

(33) The exact explanation of the different fluctuations in weight and measurement is not at present quite clear, though, as already stated, the

examination, now in process of being conducted, into the actual nitrogenous balance of certain members of the party may throw some light on this question. The Sub-Committee do not propose to enter into this discussion at this point, and do not wish to delay their report pending the completion of the above lengthy investigation. It seems to them that there is now available a very valuable mass of evidence on the amount and nature of the food required for the performance of certain measured amounts of work under more or less service conditions. They suggest, therefore, that the two reports, viz., that of the march of 1909 and the report now submitted, should be considered carefully by a representative committee composed of officers of the Supply and Medical Services, and also of such other officers as may seem necessary in the opinion of the Army Council, with the object of deciding definitely on a scale or scales of rations for field service, including the constitution of a satisfactory emergency ration.

[NOTE.—The appendices containing tables of weights, measurements, &c., can be obtained on application.—ED.]

Echoes from the Past.

THE STORY OF THE BRITISH ARMY SURGEON AND THE CARE OF THE SICK AND WOUNDED FROM 1689 TO 1702.

By MAJOR H. A. L. HOWELL.
Royal Army Medical Corps.

WHEN William III. came to the throne he found all departments of the administration and public services in a state of disorganization. Although the Army in England had come over to his side there were many in its ranks who were but lukewarm adherents to a Dutch sovereign. Ireland was openly hostile, Scotland threatened a rebellion under Claverhouse, and William's landing in England caused France to declare war against the States-General. The Army by this time had been increased by six regiments of horse (now the 1st to the 6th Dragoon Guards); the 1st and 2nd Dragoons; the 3rd and 4th Light Dragoons (now Hussars); and the 4th to the 17th Regiments of Foot. The 18th Regiment of Foot already existed in Ireland, but did not come on the English establishment until later. It was evident that in the face of the perils threatening the country a further increase in strength of the Army was necessary, and the Commons voted an increase of the Army to 87,440 men. This increase gave birth during the next year or so to the regiments afterwards known as the 7th Dragoon Guards, the 5th, 6th, and 7th Dragoons, and the 19th to the 27th Regiments of Foot. Several other regiments also appeared, but were afterwards disbanded. To each of these regiments a chirurgeon was commissioned and to each of them was appointed a chirurgeon's mate by warrant signed by the Chirurgeon-General.

At headquarters in London were a Physician-General, a Chirurgeon-General, and an Apothecary-General. There was also in Ireland (and in Scotland) a Physician-General and a Chirurgeon-General. When a war broke out it was usual to appoint to the Army in the field a Chirurgeon-General, a Physician-General, and an Apothecary-General. The duties of a Physician-General were in connexion with the supply of physicians to the Army (often, however, entrusted to the President of the College of Physicians) and with army hospitals. The Chirurgeon-General's duties dealt with the provision of surgeons and surgeon's mates for regiments and for hospitals. The Apothecary-General dealt with the supply of medicines for the Army. On one occasion at least, however, the President of the College of Physicians was asked "to see that the medicines for the use of the Army in Ireland be sent away with all possible expedition." In war time the appointment of Principal Medical Officer (or Director of Medical Services) does not appear to have existed, although both Physician-General and Chirurgeon-General were on the staff of the General Officer Commanding in Chief. Probably the duties were divided. It may be noted that the Physician-General was also usually the personal physician to the Commander-in-Chief of the Army in the Field.

In England John Knight had been Chirurgeon-General under Charles II. He was commissioned December 16, 1664, and died in November, 1680. He was also Sergeant-Surgeon to the King. His successor was Sackville Whittle, commissioned November 20, 1680, who died on February 19, 1681, and was buried in Westminster Abbey. James Pearse became Chirurgeon-General "in place of Sackville Whittle, decd.," February 21, 1681, and was followed by Thomas Gardiner on October 1, 1701.

Dr. Thomas Lawrence became Physician-General to the Army on June 24, 1685. He was re-commissioned by King William in March, 1689. Lawrence was Physician at Tangier in 1664 and Physician to the Tangier Regiment in 1683. His commission as Physician-General to the Army was renewed by Queen Anne on

August 24, 1702. He was appointed "Physician-General to the Army in Ireland and Director of the Hospital" on July 20, 1689, and served in a similar capacity in Flanders under King William and Marlborough. Lawrence's daughter Elizabeth married Sir Robert Rich, fourth Baronet, of London, Field Marshal, &c. Dr. John Hutton became Physician-General "of our Armies and Land Forces," October 20, 1691. "He was chief physician to their Majesties and had a salary of £400 a year." Hutton accompanied King William when he came over from Holland. Hutton's commission was a wide one, for it authorized him "to examine and approve of all such persons as shall be recommended for physicians or surgeons to the land forces, and to inspect and approve of all medicines internal and external." He was also officially described as "*sole* Physician-General of the armies, land forces, and hospitals erected and to be erected for the use of the Army" (Home Office Military Entry Book 3). We shall have occasion to refer to him again in connexion with the war in Ireland. Hutton died about 1702, for in that year his executor, Mr. Hutton, petitioned the Treasury for arrears due to him.

Richard Whittle, brother of the Chirurgeon-General, became Apothecary-General on January 1, 1686. He was apparently succeeded by Isaac Teale, whose commission was dated November 1, 1689. Teale was also Apothecary-General to the Army in Flanders in 1702. He died in 1710.

Dr. David Mitchell was Physician-General to the Army in Scotland in 1696, and Dr. Adam Freer in 1699. The latter was also "Intendant and Overseer of Invalids in Scotland." ("Warrant Book," Scotland, vol. xvi.).

In March, 1689, Marlborough was ordered to ship four battalions of Guards and six of the Line—the Royal Scots, Buffs, 7th, 21st, Collier's and Fitzpatrick's—to the aid of the States-General. The Royal Scots had not recognized King William as King of Scotland and were unwilling to embark. Five hundred of them set out for Scotland but were overtaken and arrested in Lincolnshire. The authorities were in a dilemma how to deal with the offenders. Military law only applied to soldiers in time of war in accordance with regulations and articles of war drawn up at the beginning of a campaign. In peace time the soldier was legally amenable only to the civil law. The result of this incident was the passing of the first Mutiny Act, which was renewed year by year, and which gave officers authority to punish men guilty of mutiny and desertion. At the same time, authority was given to the Sovereign to issue for his troops a code of regulations, by which, as well as by the Articles of War, they are declared to be bound.

With reference to desertion, the following advertisement, which appeared in the *London Gazette* in the year of the passing of the Mutiny Act, may be of interest. It is also to be found in Grose's "Military Antiquities."

"Run away, out of Captain Soames' Company, in his Grace the Duke of Norfolk's Regiment of Infantry (later, the 22nd Foot), Roger Curtis, a Barber-surgeon; a little man, with short, black hair, a little curled; round visage, fresh-coloured; in a light-coloured cloth coat, with gold and silver buttons, and the loops stitched up with gold and silver; red plush breeches and a white hat." "Whoever will give notice to Francis Baker, the agent of the same regiment, in Hattons Gardens, so that he may be secured, shall have two guineas reward!" The advertisement would lead one to think that Company barber-surgeons still existed at this date. Roger Curtis was more probably surgeon's mate, as the surgeon to the regiment at this date was one Walter Tooker.

In Scotland, Claverhouse and the Highlanders supported King James. Edinburgh declared for King William and the 25th Regiment was raised there in two hours. Mackay was sent in command of King William's troops. He had with him three Scots Regiments in Dutch pay, Hasting's Regiment (13th L.I.), the 25th Regiment and two troops of horse. He met Claverhouse at Killiecrankie, but Mackay's troops, with the exception of the 13th, broke before the Highlanders. Claverhouse was killed and his troops suffered severely. Later, the 26th Cameronians, a regiment only just raised, met and defeated the Highlanders at Dunkeld, and this ended the war in Scotland. Mackay's defeat at Killiecrankie was largely due to the form of bayonet then in use. The bayonet fitted into the muzzle of the musket, which could not be fired until the bayonet was removed. It took some minutes to fix bayonets and before the troops could do so the enemy were upon them. Mackay, taught by experience, invented the bayonet fixing round the barrel.

The surgeon of the 13th Regiment at this time was Claudius Gillart, and Gideon Elliot was the first surgeon of the Cameronians.

Long before he was driven from the throne of England James II. had prepared Ireland as a refuge in case of danger. In that island he had been able to carry out his plans for re-establishing Catholicism with more freedom than was possible in England. The unscrupulous Talbot, Lord Tyrconnel, was the head of the Irish Government, and almost all the other important offices were held by Catholics, who directed their energies in every way possible against Protestantism. The army in Ireland had been re-organized, 6,000 Protestant veterans being disbanded and replaced by Catholics who lived, it is recorded, constantly at free quarters on the Protestant inhabitants.

Amongst the Protestant officers thus turned out of their regiments in Ireland were Charles Thompson, chirurgeon to the Regiment of Guards, and Robert Weldon, his mate. These sought re-employment in London in the winter of 1688-89. Weldon became chirurgeon to the Earl of Meath's Regiment (18th Royal Irish) on May 1, 1689. He was at the siege of Namur in 1695, was re-commissioned by Queen Anne in 1702, and was still serving with the Royal Irish in Ireland in 1705. A Chas. Tomson (*sic*) was with the Army in Ireland in 1691, apparently not as a regimental surgeon but on the staff of a military hospital.

The accession of King William III. and Queen Mary to the throne of Great Britain brought about a crisis. Protestant Ireland was full of panic and rumours of impending massacre. The massacres of 1642 had not been forgotten. Many fled to England. Others armed themselves and, collecting together in towns and strong houses, prepared to fight for their liberties to the last. The two most important rallying centres for the Protestants were Enniskillen and Londonderry. Both places refused to admit Papist troops and declared for King William. King William attempted to negotiate with Tyrconnel but failed, and the latter, thinking the time had come to do away with English supremacy, called the Irish to arms. His army soon numbered 50,000 men, not including bands of irregulars who took up arms on their own account and ravaged the Protestant settlements. Numbers of officers and soldiers, including some medical officers, who remained loyal to King James, proceeded to Ireland and joined his army. The Protestants in the west and south were overpowered, but many found their way to Enniskillen and Londonderry, and here the Protestants stood at bay. Tyrconnel sent Richard Hamilton with an army to besiege these strongholds.

King James II. landed at Kinsale in March, 1689, and was accompanied by a body of French troops which had a medical staff in addition to its regimental surgeons. Londonderry was reduced to the last extremity when it was relieved on July 30 by troops from England. The Irish Army then fell back to Strabane. Enniskillen more than held its own, for its garrison, by raiding the enemy, collected quantities of cattle and ammunition and so lived in comparative comfort and security. On June 17, Colonel Wolseley and the Enniskilleners defeated the Irish sent against them at Newtown Butler, nearly 2,000 of his opponents being either killed or drowned during the battle.

On August 13, Marshal Schomberg, William's favourite general, landed at Bangor with an English army and took Carrickfergus. Schomberg's army of about 14,000 men was made up of soldiers of many nationalities, English, Scots, Dutch, French Huguenots, and Danes, and was soon joined by numbers of Irish Protestants. This force included regiments afterwards known as the 1st, 2nd, 5th, 6th, and 7th Dragoon Guards; the Inniskillings; the 1st, 3rd, 5th, 6th Dragoons; and the 2nd, 8th, 9th, 11th, 12th, 13th, 18th, 20th, 22nd, 23rd, 24th, and 27th Regiments of Foot. There were also three French, two Dutch, and nine other regiments of foot, and six English and Irish regiments of horse. During the winter of 1689-90, five regiments were broken up to recruit the rest. This army marched to Dundalk and went into camp, in the middle of September, on damp, low-lying ground to the north of the town. Most of the English troops were newly raised; some were without uniforms; the foot had no great coats and the cavalry no cloaks. Untrained and undisciplined the English quota was for the most part little better than raw material, and it was necessary to pull them together before venturing on any offensive movement. In addition, the transport was an utter failure, and we read that "every detail in every department required the personal supervision of the Commander-in-Chief." The amount of sickness from bad feeding, exposure, inclement weather, and want of clothing, soon became appalling. To add to their troubles the defenders of Londonderry joined the Army and brought with them the germs of typhus which spread rapidly throughout the camp. The Army was but ill supplied with surgeons, some regiments apparently having none, and these though equipped to deal with wounded were "totally unprovided with medicines." "There was no hospital." The misery of the troops was indescribable; all sense of decorum was lost and the unburied dead were used to keep the wind out of the tents. The men were robbed of their pay by the Treasurer of the Army and by their own officers. It took Schomberg a week's work to ensure that pay went into the men's and not into their captains' pockets.

Attempts were made to send the sick by sea to Belfast where a general hospital had been prepared, but scarcely half the men lived to the end of the voyage. Many ships lay long in the bay of

Carrickfergus heaped with dead bodies, without a living soul on board.

The failure of the medical arrangements was not, however, due to the medical officers. Harbord, the Treasurer of the Army, acknowledged his responsibility for the lack of hospitals, and admitted that had he known as much about hospitals at the beginning as he did at the end of the campaign, he might have saved two-thirds of the men. He had supplied no money for the provision of hospitals. Belfast was the base of operations and a commissariat supply depot had been established there. There was, however, no transport, and the troops at Dundalk practically starved. The Chief Commissary, named Shales, who supplied quite uneatable food, drew money largely for supplies which never reached the troops, and had actually let out, on hire, to farmers in Cheshire, the transport horses collected in England for the campaign.

As time went on some attempt at providing hospitals appears to have been made. Orders were given for the erection of huts, but the English do not appear to have done so. The Dutch troops, veterans, had early hutted themselves and they suffered least.

The Irish Army was encamped on the adjacent heights and we are told that whenever the enemy appeared the English troops were so eager to meet them that "even the sick rose and assumed their arms with alacrity." The Irish, finding they could not get Schomberg to take the offensive, sat down to watch him and soon began also to be attacked by disease. In October, 1689, Schomberg wrote to the King that 1,000 sick of the Irish Army had been sent to Dublin. In November the rains became so incessant that both armies were obliged to evacuate their camps and retire to better quarters. As the English camp broke up the army appeared to consist only of those who were sick and those who were attending on the sick. Some were sent by sea to Belfast others by road. There were not sufficient waggons to carry all away and many had sunk into such a state of apathy that they refused to be moved. Many struggled along on foot helped by their comrades, but numbers died on the road and their bodies were cast by the roadside. Brave old Schomberg ordered his officers to attend personally on the sick and, although suffering from ague, he stood for hours on the bridge of Dundalk thanking the sick soldiers for their services as they passed him.

The following table, from Story's account of the war, gives some idea of the loss incurred by the army as a result of the two months it lay in camp near Dundalk, a loss directly due to the foolish mistake of sending an army into the field which had not been carefully prepared and trained in time of peace for all that it was called upon to do in time of war :—

Died at Dundalk	1,700 men.
Died on board ship in course of removal from Dundalk to Belfast	870 ,,
Died in hospital at Belfast	3,762 ,,
Total	6,332 men.
Survivors	7,700 ,,

Some of the regiments had only sixty men left effective. It may be noted that two cavalry regiments and seven foot regiments of Schomberg's army were not at Dundalk. In winter quarters the health of the army steadily improved, and, on March 14, 1690, Schomberg wrote to the King about the pay of the sick men in hospital in Belfast saying "of whom there are not more than 200 or 300." In February Mr. Teale, Apothecary-General in Ireland, was paid £435 9s. for medicines, and attempts were made to put medical affairs on a better basis during the coming campaign. There were, in addition to the General Hospital in Belfast, smaller hospitals in the towns garrisoned by troops. There now also appeared two new field medical units : "The Marching Hospital" and "The Fixed Hospital." Before this medical officers had been appointed "to the hospital attending our Army," and, in December, 1689, Francis Smith, M.D., received a commission "to be Physician to the Marching Hospital," but this field medical unit and its complement the Fixed Hospital were not put on a proper basis until March, 1690, when Royal Warrants were signed fixing their establishment. These warrants are in the Harleian Manuscripts 7,439. The first Warrant bears no date, but from internal evidence was published early in March. It runs as follows :—

William Rex.

Our Will and Pleasure is that this Establishment for the Marching Hospital to attend Our Army in Ireland to commence from March 1, 1689-90 in the second year of Our Reign, from which time the former Establishment for the Hospital in that kingdom is to cease and determine.

	At *per diem* each.		
A Governor or Director	£0	10	11½
Two Physicians, whereof one to be Physician-General to the Army	1	0	0
The Chirurgeon-General to all the Army	1	0	0
Another Master Chirurgeon	0	10	0
Eight Chirurgeon's Mates	0	3	0
Two Chaplains, whereof one to be Chaplain to the General	0	6	8
To the Apothecary-General to the Army	0	10	0
Another Master Apothecary	0	8	0
Three Apothecaries' Mates	0	3	0
Three Purveyors	0	6	0
Two Clerks to keep the Accounts of the Hospital	0	5	0
Clerk for the beds and furniture	0	4	0
Conductor for the Wagons	0	5	0
Three Cooks	0	3	0
Two Persons to look after the bread and beer	0	3	0
Twenty Nurses as Tenders to look after the sick persons	0	2	6
Total charge *per diem*	£12	7	3½

A Royal Warrant fixing a similar establishment for "The Fixed Hospital" appeared at the same time, this hospital also to commence from March 1, 1689-90.

A third Royal Warrant was signed at Whitehall on March 14, 1690, which added, "from the 1st day of April next," one Chaplain to the Hospitals in Ireland and established "Twelve Wagons with four horses to attend our Marching Hospital," "Twelve Wagoners at one shilling and sixpence, twelve boys at eightpence, and one Smith at two shillings and sixpence *per diem*." The daily allowance per horse for maintenance was also fixed at one shilling and threepence.

On March 6, 1689, Dr. Thos. Lawrence had been commissioned "to be Physician-General to the army to be raised for Ireland." On July 20, 1689, he was commissioned "Physician-General to the Army now going to Ireland, and to be Director of the Hospital attending the same." On July 13, 1689, Paul Buissière was commissioned "to be Surgeon-General to attend His Majesty's Forces." In 1690 the following appointments were made :—

Wm. Tayler to be Purveyor to Our Marching Hospital in Our Kingdom of Ireland	1st Feb.
Theodorus van der Browig to be Chaplain to our Marching Hospital in Our Kingdom of Ireland	1st Feb.
Pat. Tisdall to be Conductor of the Wagons to Our Marching Hospital in Our Kingdom of Ireland	1st Feb.
Jno. Fountain to be Purveyor to the Fixed Hospital in Ireland	1st Feb.
Abraham Mentuick to be Purveyor to the Fixed Hospital in Ireland	1st Feb.
Ric. Thomas to be Chaplain to the Marching Hospital in Ireland	1st Feb.

Moses Leathes to be Purveyor to the Fixed Hospital in Ireland	1st Feb.
Thos. Cooke to be Clerk to the Fixed Hospital in Ireland	15th Feb.
Mat. Gunne to be Clerk to the Fixed Hospital in Ireland	15th Feb.
Fred. Mathewson to be Clerk of the beds and furniture to the Fixed Hospital in Ireland	15th Feb.
Geo. Snow to be Clerk of the beds and furniture to the Fixed Hospital in Ireland	15th Feb.
Ric. Michell to be Clerk of the beds and furniture to the Marching Hospital in Ireland	15th Feb.
Gregory Odiarne to be Clerk of the beds and furniture to the Marching Hospital in Ireland	15th Feb.
Jno. Johnston to be Purveyor to the Fixed Hospital in Ireland	1st March.

—(War Office Books, 1258, 1259).

On March 3, 1690, Schomberg wrote to the King commenting on the serious state of the hospitals, commending de Buissière, the surgeon at Carlingford, and condemning the conduct of a surgeon Thompson. Probably as a result of this and other complaints, in April, 1690, the King issued a warrant to Dr. John Hutton "to inspect the hospitals, and to inquire into the qualifications of all who pretend to the employment of physicians, surgeons, and apothecaries, and to see that all care is taken of the sick and wounded, and that all necessary medicines, nursing, and attendance are provided, and to reform and amend what is found amiss and defective." Hutton was His Majesty's First Physician-in-Ordinary.

On June 14, 1690, King William landed at Belfast and brought with him the Life Guards, the Blues, and the 4th, 5th, and 6th Regiments of Foot. His army in Ireland now numbered 37,209 men.

King James's Irish army at this date, according to Colonel Clifford Walton, numbered 45,260 men, but his army fluctuated with his fortunes greatly in numbers from time to time, and at the Battle of the Boyne it is believed that King William had on the field 10,000 more men than King James. According to King James's Army List (D'Alton) his army consisted of eight regiments of horse, seven regiments of dragoons, and fifty regiments of infantry. In an "Account of the General and Field Officers of King James's Army, Muster Rolls, June 2, 1690," we find that the Duke of Tyrconnel was Captain-General, and the Duke of Berwick (a son of James II.) Lieutenant-General, whilst Dr. Archbold was Physician to the State and Patrick Archbold, Chirurgeon-General. Nine of King James's regiments were without surgeons, each of the others had a regimental surgeon. Some of the regiments with their surgeons had been on the Irish Establishment before the accession of King

William. The names of the regimental surgeons, taken from the pages of D'Alton, were:—Power, St. John, Fitzpatrick, White, Hardin, John Taylor, Nelan, Kennedy, Owen, Connor, Nowlan, Comerford, Deignan, Dobin, Taafe (2), Magrath (2), MacDonough, Mahony, John Connor, Tully, Hagan, Seymour, Tobin, Carberry, Callanan, Robert White, Bolton, Luke Tully and Kelly. The descendant of one of these surgeons became Lord Chancellor of Ireland (Gore). When the French General St. Ruth, arrived at Limerick with reinforcements for King James's Army in June, 1690, he brought with him twenty-four French surgeons "for the use of the Irish Army."

In June, 1690, King William's Army began its march southwards. King James's Army, which had been reinforced by a considerable number of French troops under Lauzun, fell back behind the River Boyne, and taking up a strong position awaited King William's attack. The battle of the Boyne, fought on July 1, resulted in a great victory for the English. The Irish infantry fled at the first onset so that most of the loss on the Irish side fell upon their cavalry which fought bravely. The loss was not great on either side, the English losing about 500 killed, and the Irish 1,500. King James fled to Dublin, and soon afterwards embarked at Kinsale for France. Lauzun and Tyrconnel with the remains of their army evacuated Dublin, which city King William entered in triumph. It may be noted that during King James's occupancy of Dublin, Trinity College had been seized and occupied by a military garrison. The Royal Hospital of Kilmainham had also been appropriated by Tyrconnel and the old soldiers turned out. The Royal Hospital of Kilmainham was converted by William into a hospital for the sick and wounded during the war, and it was not until the Irish war was over that it again became a resting-place for the soldier in his old age, as a result of the following petition of the Lords Justices of Ireland to the Earl of Nottingham, Secretary of State, dated February 6, 1692:—

"In 36 Charles II., there was granted to us, under the title of 'Governors of the Royal Hospital of King Charles II. for ancient and maimed soldiers of the Army of Ireland,' a Charter house, and a certain parcel of land to be held for ever by us, as a corporate body in frank-almoigne, without power of resigning it to the King or his successors, or of alienating to any other use whatsoever anything therein granted, but to continue a hospital for the uses aforesaid; and that all the said officers and soldiers of the said army should be maintained with such salaries and allowances as the incorporated governors and their successors should appoint; and that for the continual support of the said house to the uses aforesaid there should be a deduction of 6d. in the pound out of the pay of the said army and all other persons, on the military list of the establishment of the kingdom for ever.

"But the continuation of this house, notwithstanding this grant, has been subverted, and the officers and soldiers turned out by the late Lord Tyrconnel, and so continue. His Majesty has, since his coming to Dublin, employed the house as an infirmary for the sick and wounded soldiers during the war, most of whom are now recovered and sent to the regiments to which they belonged, and there remain only such as are utterly disabled. We therefore desire you will lay before His Majesty the former state of this house before the subversion of it by Tyrconnel, that it may be again restored to its old foundation." (State Papers, Ireland, 354).

According to the late Surgeon-General A. Gore there was at this time also established in James Street, Dublin, a General Military Hospital. This hospital existed until, a century later, it became so dilapidated that it necessitated the building of the present Royal Military Infirmary in Phœnix Park. The gateway of the hospital in James Street was still standing a few years ago.

It had now been wisely decided to adopt Cromwell's plan of campaign for the reduction of Ireland, and William conquered the country as far as Limerick where his army received a check. Lauzun, the French General, considered Limerick untenable and withdrew with his troops, but Sarsfield successfully defended the city. In a daring raid he intercepted King William's artillery train when on its way to Limerick, captured it, and slaughtered the personnel. The surgeon may have been amongst them for he is not mentioned amongst the officers captured, and in the list of officers of the artillery train (Ordnance Warrant Book xiii.) which replaced the one captured, although the pay of the surgeon is shown as being 10s. a day, he is the only officer not named.

William's army had no houses to shelter them during the siege of Limerick. Heavy rains came on and the country around became a marsh. At last, on September 3, a final vigorous assault having failed, the siege was raised. The king returned to England and Ginkell was left to carry on the war. Sickness increased, at a terrible rate during and after the siege. In September, Count de Solmes wrote to the King from Cashel: "Illness continues to increase, and in Belcastle's regiment there are not more than ten men capable of bearing arms. On account of the sickness doctors are wanted. We have to move a great many men into the hospitals. There are a great many sick and wounded in the Guards, fifty have died in a short time."[1]

And again from Tipperary: "Illness amongst the troops increases, and there are more sick than we can take care of." It was decided to separate the army and go into winter quarters. The sick from Limerick had been conveyed to Carrick and to Clonmel. Just before this the King had noted for the guidance of the Count de Solmes: "The troops should know, in good time, where their winter quarters are to be, so that they may send on their useless baggage and their sick, but care must be taken that they do not also send on those men who are able to serve and who would only go too readily." The change into quarters had a good effect, for in November Count de Solmes wrote to the King from Galway: "The enemy are dying apace, and our men are in good health."

In the meantime another English Army had been more successful in Ireland. Marlborough had landed with a force, and, in a campaign which lasted only a month, took Cork (September 28) and Kinsale (October 5). Marlborough's troops also suffered greatly from want of good provisions and lack of money with which to purchase the ordinary necessaries of life. Brigadier Churchill wrote that his troops must either conquer or starve, that they were well-nigh desperate, and that amongst 500 soldiers there were not 100 pairs of shoes. Sickness increased at an appalling rate, and it became necessary to establish a military hospital at Kinsale. In the Council Book of Kinsale it is recorded: "That Brigadier-General Churchill, our Governour, be informed that Mr. William Hull's house, formerly Captain Stawell's, deceased, is the fittest in the town for an hospital, and that Mr. Hull be satisfied by the Corporation for the same, and that the Governour be entreated to lend or sell coals for the use of the Guards and hospital, the charge to be defrayed by way of a rate on the inhabitants of the towne."[2]

During all this fighting the medical organization had been as follows: With each regiment was the chirurgeon and the chirurgeon's mate. With the main body of the Army was the marching hospital with a fixed hospital in some town in its rear; each garrisoned town had its small hospital, and there was, in Dublin, the fixed hospital installed at the Royal Hospital, Kilmainham. There was also the General Hospital in James Street, Dublin. Six months or so after the Warrant establishing the marching and fixed hospitals, we learn from a letter in the Clarke MSS., it was discovered that the funds of the new hospitals had been "very ill applied." Inquiries were instituted, and proposals for a reformation of the system put forward by the Lords Justices, aided by some of the Army physicians and by Colonel Venner, 24th Regiment, who was Governor of Kilmainham. In April, 1691, the King signified his approval of the proposals and directed "that the said hospitals be forthwith established and settled, and fit persons appointed for that service. And you (the Lords Justices), are to appoint such a salary as you shall judge suitable to that employment."

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[1] These, and following quotations are from the Calendar of State Papers, Domestic.

[2] Quoted by Lord Wolseley in his "Life of Marlborough."

The proposed new organization was as follows :—

(1) "That the chief hospital be established at Dublin, and the general magazine of medicines and utensils, with all other necessary provisions for the other hospitals be preserved there.

(2) "That there be one hospital to march, always to attend the camp, and that there be a third hospital erected in the best convenient town, nearest to the place of action to receive the sick and wounded, as the sieges or camp shall remove.

(3) "That there shall be one physician for each of the three hospitals.

(4) "That there shall be one Master-Surgeon to attend upon each fixed hospital, and that the Surgeon-General with one Master-Surgeon attend the camp, or where the General be pleased to command them.

(5) "That there be eighteen surgeon's mates, to be disposed of in the said hospitals as there may be occasion.

(6) "That there be a Master-Apothecary to each hospital and six apothecary's mates, to be employed in such places where their services may be most required.

(7) "That there be one purveyor to each hospital, who shall be obliged to perform the duty of butler for distributing the provisions to the sick and wounded, except in the hospital of Kilmainham, where a butler with his assistant will be required.

(8) "That there be a clerk to each hospital.

(9) "That there be one cook with his assistant to each hospital.

(10) "That there be one butcher allowed for the hospital attending the camp.

(11) "That there be allowed forty nurses or 'tenders' to the three hospitals (whereof twenty are at present in the hospital of

Kilmainham), with power to augment or lessen the said number of nurses, as occasion shall require.

(12) "That there be fifteen washers, to be disposed of into the several hospitals, proportionate to the number of sick."

In addition, Colonel Venner, Governor of the Royal Hospital, Kilmainham, made the following proposals concerning the tents and servants of the marching hospital :—

(1) "That the tents may be made 10½ ft. high, 8½ ft. broad, and 20 ft. long ; that in each tent there may be four beds, each bed to be 4 ft. wide, or a little more, that it may hold two sick or two wounded men; that there may be twenty-five of these tents, lined only with some old tents which we have in the hospital that are good for nothing else; and that they may be so made that at the end they may be joined to each other and that there may be a tent pole in every tenth foot, so that in these twenty-five tents there may lie 200 men, which may be sufficient for this campaign.

(2) "That there may be twenty-five men servants, that may be allowed instead of so many women, as nurses, who can help to put up the tents, or, if necessary, remove them, and bring wood, water, and other necessaries for the sick and wounded men, and that there may be ten women as washers.

(3) "That there may be twelve cars with small horses to carry these tents, and that the cars may be so made as to carry off the sick and wounded to any fixed hospital, and that the servants may be drivers, which will save the King the charge of two waggons.

(4) "That these twenty-five servants may have twenty-five firelocks to serve as a guard for the hospital, and that they may be clothed in one livery.

(5) "That there may be eight wagons, four horses to each wagon, to transport the medicines, bedding, and other things that must be kept dry. That there may be two conductors to the marching hospital, that they may have the command, as well of the twenty-five men as of the carters, and that the twenty-five men may have 15d. a day, and that there may be eight boys as assistants to the wagoners." (State Papers, Ireland, King's Letter Book I.)

It is evident that this medical organization for the Army in Ireland was well conceived, it was indeed a foreshadowing of the system of to-day. We have in the Marching Hospital a distinct separate, self-contained military unit with a distinctive uniform or livery, and its own transport ambulance cars and general service wagons. The advanced Fixed Hospital was evidently what we would now call a Clearing Hospital. With regard to the personnel, the apothecary's mates were assistants to the physicians, and were the dispensers to the hospitals. The purveyor was an official who kept his place in connection with military hospitals until about forty years ago. He combined in himself the duties of a commissariat officer and the modern quartermaster as far as food supplies went. The conductor was a transport officer, and had apparently a disciplinary control over the twenty-five men of the unit, similar to that held by the Officer of Orderlies in the Army Hospital Corps of modern times. We may note also the appearance of the Master-Surgeon in our annals. He came in rank between the Surgeon-General and the Surgeon in the same way as did the Surgeon-Major of James the First's time. Very few appointments to the rank can be traced. The title disappeared somewhere about the middle of the eighteenth century. The last of them, one John Cherrington, "Master-Surgeon of the late garrison at Louisburgh," drew his half-pay until 1785 or later.

The furnishing of only one bed for every two sick or wounded men will not surprise us when we remember that the British soldiers did not get separate beds until the Duke of Wellington became Commander-in-Chief.

(*To be continued.*)

Reviews.

IMPROVISED METHODS OF AID IN THE FIELD. By Lieutenant-Colonel Mackay, R.A.M.C.T.F. Eyre and Spottiswoode, 1911. Pp. 112, 2 diagrams, 45 illustrations. Price 1s. 6d.

This little work is intended for the use of Voluntary Aid Detachments and members of the Territorial Royal Army Medical Corps.

In his preface Lieutenant-Colonel Mackay points out that Voluntary Aid Detachments having no depots of stores to draw upon must necessarily rely to a great extent on improvised articles of equipment. To facilitate their training in methods of improvisation, the author has collected from numerous sources a great deal of useful information, and has embodied it in this little manual.

Chapter I. gives a general ntroduction to methods of improvisation, tools required, preparation of stretchers, knots, &c. The next chapter gives a review of improvised methods in the collecting zone. The author wisely points out that Voluntary Aid Detachments will not be employed in the collecting zone, but that on an exceptional occasion, such as an attack on a convoy or isolated post, the services of Voluntary Aid Detachments might be required in the first line of medical assistance. He gives a coloured plate showing the scheme of field medical organization for a division of the regular army; the word "infantry" should have been omitted from the heading, as an infantry division no longer forms part of our organization.

The section on improvised transport in the zone of evacuation is distinctly good. The use of springs to absorb shock when loaded stretchers are being conveyed on the floor of an ordinary wagon is not satisfactory; under these conditions the resiliency of the springs, although lessening the contact shock, greatly increases the movement of the stretchers and the patient's discomfort. Pads made of straw, grass, brushwood, &c., are much more effective.

The chapter on improvised transport by rail is very good, but ununfortunately Port's method, which is the simplest and least expensive plan for adapting goods vans to ambulance purposes, is not mentioned; Hunsdiecker's method is really a modification of Port's, springs being substituted for slings.

On p. 77 the carrying capacity of a barge used for ambulance purposes has been estimated at ten patients; as, however, the patients are not likely to remain any great length of time in the barge, it might accommodate at least double this number. Some useful hints are given on the construction of improvised shelters.

The chapter on extemporized hospitals has a pretty plate showing temporary hospitals formed by Voluntary Aid Detachments. The administrative arrangements which would be necessary to distribute wounded to all these hospitals would be somewhat complicated. The instructions on the establishment of temporary hospitals are practical and good. Lieutenant-Colonel Mackay deserves great praise for the pains he has taken to collect a quantity of useful information in a handy pocket-book form. The illustrations and descriptions are clear and easily understood. In producing this manual he has greatly facilitated the work of training Voluntary Aid Detachments.

C. E. P.

GUIDE TO PROMOTION FOR OFFICERS IN SUBJECT (a) (i) REGIMENTAL DUTIES. By Major R. F. Legge, the Prince of Wales's Leinster Regiment. Third Edition, 4s. net. Published by Gale and Polden, Ltd.

This work will be found a most useful guide to anyone desirous of acquiring information in regimental duties, more particularly those officers of the Royal Army Medical Corps who have yet to pass in subjects (a) (i).

In this, the third edition, the author has rearranged the chapters so that each chapter deals with one of the sub-heads of subject (a) (i), in the order in which they are detailed in King's Regulations, Appendix XI. 1 (a).

The book is generally up-to-date, and all information is supported by references to official text-books and regulations. The author writes clearly and concisely except in his description of "Free Issues," p. 119, which is somewhat involved; here, the various allowances granted to the soldier under the present system are not as lucidly stated as they might be. It is also unfortunate that in a work so generally accurate the specimen conduct sheet (A.F.B., 121), p. 100, should contain several entries which have not been made in accordance with the instructions contained in King's Regulations, paragraphs 1921 (ii) and 1916 (i); for example, in the last entry, dated September 15, 1912, the correct offence is "drunkenness on duty," the date of confirmation of the award should be given, and the entry "fined £1," which is shown in columns of remarks, should be made under "Punishment awarded."

F. S. I.

THE ETIOLOGY OF BERI-BERI. By Henry Fraser and R. T. Stanton. Singapore: Kelly and Walsh, Ltd. Price, 7s.

The main results of Fraser and Stanton's experiments on the causation of beri-beri are already familiar to those of our readers who keep themselves in touch with current medical literature. In this book they are set forth in orderly fashion, with complete details of the experiments which led to the authors' conclusions. After dealing with the various facts which go to show that beri-beri in man is associated with the consumption, as a principal article of diet, of rice which has lost its subpericarpal layer, the authors discuss the preparation of rice for food, and the differences in the composition of the various kinds of rice. Staining failed to show any micro-organisms present in rice which produced beri-beri, and analysis, so far as it went, failed to demonstrate the presence of a poison in the incriminated white rice. Analysis, however, showed that polished rice contained rather less protein and fat and considerably less ash than parboiled or unpolished rice. Calculation showed that the differences in protein and fat as such could not account for the differences in the action of the two varieties of rice, since, in an average ration of 1·3 lb. the consumer of polished rice would only receive 9 gr. less protein and 23 gr. less fat than the consumer of parboiled rice. On the other hand, the ash of parboiled rice was nearly twice as much as that of polished rice, and it seemed reasonable to look for the cause of the differences in the beri-beri producing properties of various rices among those constituents which go to form the ash. After unsuccessful experiments on anthropoids and monkeys, which died of dysentery or of inanition, the authors had recourse to experiments on fowls. Eight out of twelve fowls fed on polished rice developed polyneuritis, whilst twelve fowls fed on parboiled rice remained well. When parboiled rice was exhausted with hot alcohol it caused polyneuritis when given to fowls, whilst, on the other hand, the alcoholic extract of parboiled rice prevented the onset of polyneuritis when given to fowls fed on polished rice. The food factor whose absence caused the appearance of polyneuritis in fowls was, therefore, something soluble in hot alcohol (it did not appear to be soluble in cold alcohol); this factor appeared to exist in the subpericarpal layer of the rice, seeing that the addition of polishings of rice to a diet of polished rice prevented the appearance of polyneuritis in fowls, and of beri-beri in man. The proportion of phosphorus salts found in a rice was found to be inversely proportional to its beri-beri producing properties, and this fact served as a practical method for estimating the beri-beri producing properties of a given rice; but as rice exhausted with hot alcohol is found to have lost very little of its phosphorus, it is evident that the phosphorus content of a rice is not the essential factor in the production of a disease, and it seems that the phosphorus content simply serves as an index of the amount of subpericarpal layer remaining on the rice grains. Exposure of padi to steam at 120° C. destroyed the protective substance, and fowls fed on such steamed rice developed polyneuritis; on the other hand, when the rice was immersed in water and heated to 120° C., the protective substances were unaffected. Experiments in determining the nature of the protective substance showed that it was soluble in 0·3 per cent hydrochloric acid, and that it remained in solution when the phytin in the fluid was precipitated by alcohol; the addition of an alkali to the solution remaining after the latter process destroyed the protective substance. Further experiments showed that the protective substance was not a fat, nor did it rest wholly in the protein of the rice.

W. S. H.

PHILOSOPHIES. By Ronald Ross. London: J. Murray, 1910. Pp. viii and 56. 1s. net.

For the man of science to make poetry out of his experiences is rare. This has been done by Sir Ronald Ross in his "Philosophies," a little book of verses which he brought out simultaneously with his work on the Prevention of Malaria. In a preface of unusual interest he not merely tells us that these verses were written in India between the years 1881 and 1899, mostly during his researches on malaria, and sets forth the faith and ideals, the hopes and despairs, of one who has toiled as an exile in a land the miseries of whose people have deeply impressed him. "Racked by poverty, swept by epidemics, housed in hovels, ruled by superstitions, they presented the spectacle of an ancient civilization fallen for centuries into decay. One saw there both physical and mental degeneration. Since the time of the early mathematicians science had died; and since that of the great temples art had become ornament, and religion dogma. Here was the living picture of the fate which destroyed Greece, Rome, and Spain; and I saw in it the work of nescience—the opposite of science." . . .

A race of wretches caught
Between the palms of need
And rubb'd to utter naught,
The chaff of human seed.

The following verses were written some years before his great discovery :—

I thought, tho' fettered fast,
I yet might move my hands
To cast or to recast
Some labour—sift the sands.

For knowledge—search the vast,
Some hidden hope to find—
Perhaps to help at last
The cause of human kind.

O hope abandon'd! Not
In me the worth or wit,
God gave this lowly lot
Because I merit it.

In humble ways I move
Myself to little things;
The heated hands I prove,
I watch the light that springs

Or fades in fever'd eyes;
My only solace here,
Not to be rich or wise,
But to have done with fear.

God sees the silent space
Where footsteps never trod;
And in the lonely place
The listener is God.

And again :—

In this, O Nature, yield, I pray, to me.
I pace and pace, and think and think, and take
The fever'd hands, and note down all I see,
That some dim distant light may haply break.

The painful faces ask, Can we not cure?
We answer, No, not yet; we seek the laws.
O God, reveal thro' all this thing obscure
The unseen, small, but million-murdering cause.

Here is his pæan of joy on finding the clue to the problem (August, 1897):—

This day relenting God
Hath placed within my hand
A wondrous thing; and God
Be praised. At His command,

Seeking His secret deeds
With tears and toiling breath,
I find thy cunning seeds,
O million-murdering Death.

I know this little thing
A myriad men will save.
O Death, where is thy sting!
Thy victory, O grave?

The poem, styled "In Exile," constituting the latter half of the little book, the author describes as not a diary in verse, but rather the figure of a work and of a philosophy, making use of the symbols of a land so well known to most of us:—

A land of clamorous cries,
Of everlasting light;
Of noises in the skies
And noises in the night.

There is no night, the sun
Lives through the night again;
The image of the sun
Is burnt upon the brain.

The reflections there embodied he thus sums up:—

"I cannot rise with those who would soar above reason in the chase of something supernal. Infinities and absolutes are still beyond us; though we may hope to come nearer to them some day by the patient study of little things. Our first duty is the opposite of that which many prophets enjoin upon us—or so I think. We must not accept any speculations merely because they now appear pleasant, flattering, or ennobling to us. We must be content to creep upwards step by step, planting each foot on the firmest finding of the moment, using the compass and such other instruments as we have, observing without either despair or contempt the clouds and precipices above and beneath us. Especially our duty at present is to better our present foothold; to investigate; to comprehend the forces of Nature; to set our state rationally in order; to stamp down disease in body, mind, and government; to lighten the monstrous misery of our fellows, not by windy dogmas, but by calm science. The sufferings of the world are due to this, that we despise those plain earthly teachers, reason, work, and discipline. Lost in many speculations, we leave our house disordered, unkept, and dirty. We indulge too much in dreams; in politics which organize not prosperity but contention; in philosophies which expressly teach irrationalism, fakirism, and nescience. The poor fakir seated begging by the roadside, with his visions—and his sores! Such is man. . . ."

J. T. C.

AN INTRODUCTION TO THERAPEUTIC INOCULATION. By D. W. Carmalt Jones. London: Macmillan and Co., 1911. Pp. xiii and 165. Price 3s. 6d. net.

This book, as its title implies, is intended as an introduction to the practice of therapeutic inoculation, and it provides the practitioner with a useful survey of the principles and practice of vaccine therapy. The first part gives in simple language, without unnecessary detail, the main facts connected with the theory of the subject; it contains also a short chapter on vaccine therapy in practice in which the writer very properly insists on the absolute necessity for making a diagnosis, not only of the broad fact that the patient has such and such a lesion, but also of the actual cause of the trouble; if this point were more generally recognized one would not so often see such things as, for example, the administration of antistreptococcus serum for a disease due to infection with *Bacillus coli.* Dr. Jones also points out that vaccine therapy does not do away with the necessity for the use of those clinical methods of treatment which have been found beneficial hitherto, another point which is sometimes lost sight of. This part also contains a chapter on bacteriological diagnosis and one on the general results of vaccine therapy. These last are given in greater detail in the latter part of the book, and will serve to provide the practitioner with a fairly balanced view as to what he may expect from treatment by inoculation; they will certainly serve to correct a very prevalent view that the exponents of vaccine therapy claim to produce miracles and to cure every time; that the method does marvellously well, all those who have had practical experience of it will agree, but it cannot cure all cases, and, when it does cure, the cure is not always of that miraculous rapidity which some people expect.

In the second part the author goes into the subject in greater detail, giving practical directions for the various methods employed and discussing each group of diseases in turn. In the directions for sterilizing the syringe the author uses hot oil; in our hands this method proved to be unreliable, and led to frequent contaminations of blood cultures; we now prefer the use of boiling 1 in 20 carbolic solutions, followed by washing the syringe out with sterile saline. One notices also in the directions for making a blood culture that it is recommended to insert the needle at an angle of 45°; in the hands of many people this would probably lead to the needle going right through the vein. A more certain method is to slip in the needle in a direction almost parallel to the skin, and it is well to remove the constricting band before withdrawing the needle so as to avoid the production of an unsightly ecchymosis. The six cases of tubercular peritonitis which are quoted seem to have been particularly unfortunate ones, since our experience of four cases has led us to attach very great value to vaccine treatment in these conditions, possibly the cases one gets in the service and in private practice are not so advanced as those seen in the out-patient department of a general hospital. In the appendix there are given details of technique, such as the making of blood capsules, preparation of vaccines, &c., &c., and, so far as it is possible to learn technique from a book, these instructions should prove very useful.

The whole book is written in an interesting and practical fashion, and will be helpful especially to the practitioner who wishes to get a general idea of the subject without intending himself to enter into the somewhat troublesome field of preparing vaccines and controlling their administration; it will also serve as a very excellent introduction for those commencing the study of vaccine therapy, while the experienced will find many useful facts and hints in its pages.

W. S. H.

ALBUM OF PHOTOGRAPHS ISSUED BY THE SOUTH INDIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION. London: John Bale, Sons and Danielsson. Price 10s. 6d. net.

This is a very interesting series of photographs of tumours and other pathological conditions collected by various members of the South Indian Branch of the British Medical Association. The photographs illustrate for the most part extreme conditions of disease such as would be very rarely seen in this country where the surgeon would be called to intervene long before the growths had attained the dimensions shown in the pictures.

W. S. H.

Current Literature.

Quinine and Tetanus.—It will be remembered that Sir D. Semple, in a recent memoir, published the results of experiments, which served to confirm the older ones of Vincent, that the hypodermic injection of quinine into animals infected with tetanus spores caused them to die of tetanus; he attributed this result to the fact that quinine given in the strengths usually employed produced a necrotic area in which, if tetanus spores gained access to it, they developed and produced their characteristic toxin. He further showed that washed tetanus spores injected into a guinea-pig can be recovered from the site of inoculation up to seven months after the injection. He deduced from this that the occasional cases of tetanus which had arisen in man after injection of quinine were due to the action of quinine in rousing a dormant infection, and he expressed an opinion that hypodermic injection of quinine was unjustifiable unless it was accompanied by the injection of tetanus antitoxin. Major F. A. Smith, I.M.S., in the *Indian Medical Gazette* for September, 1911, takes strong exception to this position, on the ground that the very small risks of producing tetanus does not justify one in abandoning a method of very great value in the treatment of obstinate or severe malaria, and that the routine administration of tetanus antitoxin along with quinine is impracticable on account of the expense; one might also add on account of the complication introduced in the way of serum rashes, affections of joints, and fevers. He bases his contention on the fact that he has given quinine hypodermically as a routine practice since 1899, that he has given many thousands of doses without accident, and further, that in many cases the alternative to hypodermic or intramuscular injection of quinine is the withholding of it altogether. He points out that Sir David Semple produces no direct evidence that tetanus spores are ever harboured in the tissues of the human subject, though he has found them in the intestine; also that in only one of the ten cases of tetanus which are referred to as having come under Semple's notice is there any record of a bacteriological examination of the fluid injected, and in that particular case tetanus bacilli were, as a matter of fact, isolated from the water used to dissolve the quinine. He points out also that the doses of quinine given to the guinea-pigs in the washed spore experiments were out of all proportion to those given in man, representing as they do doses equal to 90 or more grains (Major Smith seems here to have made some error in his calculation, since on referring to the memoir the equivalent dose for man works out at from 233 to 348 grains). Major Smith also contends that the condition of a guinea-pig in which relatively large doses of tetanus spores have been injected has no parallel in any condition occurring naturally in man. He affirms that, if the presence of a necrotic focus in man may determine the outbreak of a quiescent tetanus, a patient with an unopened boil is in a much more dangerous position as regards tetanus than one who has had a small injection of quinine. His conclusion is that the experiments provide no justification for the withholding of quinine injection in cases where it is indicated, provided the quinine is injected with suitable antiseptic precautions.

W. S. H.

Yellow Fever.—Seidelin (in the *Yellow Fever Bulletin*, vol. i., No. 4, August, 1911) describes the clinical characters of yellow fever which serve to differentiate it from other tropical fevers. He points out the great variability in the severity of the disease and that the chief difficulty in diagnosis occurs with the milder attacks. Jaundice, especially when it appears during convalescence, is an important sign, nausea is very constant, though it is sometimes only elicited by the administration of purgatives, or by pressure on the epigastrium. Epigastric tenderness is a constant and important sign, equally important but not so constant is hæmatemesis, especially in the form of black vomit or of small flecks of black blood in a clear or bile-stained vomit; with it one often gets other hæmorrhages, e.g., from the gums. A remission of temperature on the second, third, or fourth day is a valuable sign when it occurs, it very often lasts only for a short time, and may be missed unless the temperature is taken, say every two or three hours; Fajet's sign, a comparatively low pulse rate, is of great importance; it is specially frequent during the second period of fever and during convalescence, when the rate may go down to 40 or 50, but is easily excited by exertion. Albuminuria and casts in the urine are practically invariable, but the amount varies greatly, and albumen may only be found by the use of the more delicate tests; bile in the urine is a useful sign when it occurs. The blood shows no constant changes, though there is frequently a slight leucopenia; leucocytosis speaks against the diagnosis of yellow fever.

Seidelin is of opinion that a large proportion of tropical diseases labelled "*febrile gastritis*," "*gastric fever*" and "*gastritis with cardiac failure*," are really yellow fever. There is evidence that immunity from yellow fever after one attack is not absolute.

W. S. H.

Medical and Sanitary Report for the German Colonies (*Medizinal-Berichte uber die Deutschen Schutzgebiete fur das Jahr* 1909-1910. Pp. 649, 8vo, 18 illustrations, 45 diagrams; numerous charts and tables. Published by the Imperial German Colonial Office. Berlin, 1911: Mittler and Sons. Price 11 marks, bound).—The German authorities, being fully alive to the fact that the colonies could not be developed profitably without a plentiful supply of healthy labour, have made great efforts to secure this by a systematic campaign against the prevailing diseases of the country and also by providing facilities for the efficient treatment of sick persons, both European and native. A very full account of the work, both preventive and curative, accomplished during the year is given in the report, from which the following notes are taken.

Small-pox.—This disease has frequently occurred in severe epidemic form. The authorities have therefore made great efforts to vaccinate the whole native population. One of the first difficulties encountered was that the lymph, imported at great expense from Germany, soon lost its virulence. In order to restore this and to provide a plentiful supply at a low cost, the lymph was inoculated into calves immediately on its arrival in the colony. In each district a lymph station has been established and in these the lymph on its arrival from Dar-es-Salaam, the headquarters station, is at once re-inoculated into calves. In this way it has been found possible to provide a supply of virulent lymph sufficient to meet the district surgeon's demands. On the whole the native population was taking kindly to vaccination, although in some districts passive resisters were still numerous.

Plague.—This has been brought under control, only two epidemics having occurred in the interior of the East African Colony. The preventive measures were mainly directed to the extermination of rats.

Malaria.—Mosquito breeding places in towns were drained, filled up or regularly oiled. On plantations employing irrigation, steps were taken to control the irrigation, so that no mosquito breeding places should result. In towns a systematic examination of all natives, with special attention to the children, was carried out. Those who showed signs of malarial infection were registered and made to undergo a three months' course of quinine.

Anchylostomiasis.—In the coast area this disease is very prevalent. Instruction leaflets printed in German and Swaheli were freely distributed to planters and natives. The district surgeons made frequent visits to the plantations to inspect the labourers. The stools of those suspected of suffering from anchylostomiasis were examined for ova; when these were found the person was treated with thymol. The thymol was administered in the form of tablets, the patient being told to break them up by biting and then to swallow the pieces with a mouthful of water. Each case received 6 grm. of thymol in doses of 2 grm. every two hours. The only toxic symptom observed after this large dose was a temporary condition resembling drunkenness. The thymol treatment was repeated after an interval of four weeks. The principal preventive measure adopted was the introduction of a latrine system. The native's usual custom is to defæcate alongside the source of their water supply, thus affording excellent facilities for the spread of the disease. They are now being educated to construct and use proper latrines. Where these instructions have been followed there has been a marked reduction in the incidence of the disease.

Sleeping Sickness.—To prevent the importation of this disease from Uganda into German East Africa the passenger traffic has been placed under medical supervision with observation camps. Where possible the lake shore and river banks have been cleared of vegetation in order to get rid of the *Glossina palpalis.* Where this could not be done the inhabitants have been removed to cleared areas.

In Togo a systematic investigation is being carried out to determine exactly the limits of the infected areas. Camps have also been formed in the hopes of segregating all the infected persons. These are not popular and have not therefore been very successful. Treatment by atoxyl at an early stage of the disease has yielded encouraging results, but owing to the difficulty of following up patients, who leave the camps to return to infected areas as soon as they feel well, it has not been possible to claim any cures. The general health of the Europeans has greatly improved owing to the sanitary measures adopted. In the Cameroons the mortality among Europeans from tropical diseases in 1911 was only 2 per cent of the whole population.

For those interested in tropical medicine the report is well worth careful study. It describes in detail the various measures undertaken together with their results. The clinical aspect of tropical diseases is also very fully dealt with.

C. E. P.

Wassermann Reaction.—Plehn (*Berl. klin. Wochenschr.*, August 21, 1911, p. 1545) subjects to a critical analysis the results of Wassermann's test applied to the blood serum of 200 people; 139 of these gave no specific history; their sera were negative. He draws attention to the fact that positive responses have been reported in neurosis, lead-poisoning, scarlet fever, pneumonia, leprosy, tumours, phthisis, Hodgkin's disease, myeloid leukæmia, yaws, relapsing fever, and ague. He relates four instances of the blood of syphilitic individuals changing from positive to negative without treatment. He has observed a persistent positive reaction in patients who have lost all signs of infection, which has remained uninfluenced by therapeusis; on the other hand, he remarks on the absence of a positive response in a small proportion of cases of late syphilis, even though tertiaries be present. Contrary to the experience of Ledermann and others, he thinks that syphilis plays little or no part in the causation of arterio-sclerosis, for of 12 cases the test was negative in 9, and doubtful or positive in 3 only. He found that the blood of 4 general paralytics was negative, though the cerebro-spinal fluid responded in 1. The serum of 4 out of 6 patients suffering from locomotor ataxy was positive. He records a case in which energetic mercurial iodide and Zittmann treatment failed to avert cerebral symptoms, and thinks that such is the usual event. In this opinion he is opposed by Neisser. He has noted a positive result in 3 elderly people sixteen to thirty years after the last signs of infection, hence he would exercise caution in interpreting the significance of a positive reaction in old age. He considers that the Wassermann test by itself should not be used as an indication for treatment in late syphilis, though it is invaluable for diagnostic purposes in the early period.

Michaelis (*Berl. klin. Wochenschr.*, September 4, 1911, p. 1662), who carried out the tests for Plehn, employed watery and alcoholic syphilitic liver extracts and alcoholic extracts of human and ox hearts. Wide divergences in the results were exceptional.

Citron (*id.*) states that he has observed only five anomalous reactions in 10,000 cases. A positive serum remains positive and a negative remains negative, except when specific treatment causes changes. He relates a case of spastic spinal paralysis which had been treated with anti-syphilitic remedies. The Wassermann reaction was negative. He tested the blood of the healthy husband and discovered that it gave a positive response. He thinks that an examination of the serum of relatives may sometimes throw light on a doubtful ailment. He draws attention to the immense number of cases of syphilitic disease of the heart, aorta, and other arteries which he regards as a comparatively early lesion, though its presence is only recognized by its effects in later years. C. B.

The Wassermann Reaction under Mercury.—Gennerich (*Veröffentlichungen a.d., Marine-Sanitätswesen,* 1911, H3) has studied the effect of treatment on the serum reaction. Bruck observed a positive reaction in 53 normal sera out of 5,028. Gennerich tested the blood of 120 patients with no specific history, 60 of whom suffered from gonorrhœa, with uniformly negative results. It is to be remembered that the blood in scarlet fever and ague gives a positive response during the pyrexia. Frambœsia, trypanosomiasis, leprosy, and late phthisis are diseases in which the blood may exhibit the Wassermann reaction. The earliest date after syphilitic infection on which Gennerich tested the blood with positive result was twenty-seven days. The reaction may be delayed for nine or ten weeks, or may not become evident until a week or a fortnight after the outbreak of secondaries. He obtained negatively-acting sera in only 2 per cent of 300 cases of syphilis tested during the eruptive stage, and in from 10 to 15 per cent of those who were suffering from later symptoms. For mercurial treatment he recommends as the first course four injections of 0·06 to 0·07 grm. of calomel in oil every four days, then 0·04 grm. with five-day intervals on three occasions. Seven weeks' rest is allowed. A second similar course is given, followed by two months' interval. Finally, eight or nine weekly injections of oleum cinereum, containing 0·12 grm. of mercury in each. In this manner he treated 29 cases of primary syphilis with success. No secondaries developed. In all but three the Wassermann reaction was negative at the end of the course, but in 11 it passed through a positive phase before becoming negative. He gives a list of 11 cases in which this abortive treatment failed to avert secondary symptoms, though the blood test became negative in all except one. A third table comprises 45 cases of secondary syphilis, which remained free from symptoms after the completion of the courses. The serum reaction became negative in all but two. If symptomatic treatment only was adopted the change in the blood test was not so constant; four out of 11 sera remained positive. Gennerich concludes that instances may occur in which the serum reaction continues positive in spite of the disappearance of symptoms and vigorous mercurial therapy. Negative sera may become positive under the influence of specific remedies, though the lues is cured clinically. He reports seven examples of this, in which salvarsan was the agent which provoked the positive response. He advocates this method of diagnosis in doubtful ailments in which the blood has given a negative Wassermann reaction. In common with other observers he has noted many cases where with a blood negative to the test secondaries are present or shortly appear. The inunction method is unsuitable for the abortive treatment of syphilis or for the suppression of a positive Wassermann reaction. C. B.

Salvarsan in 1,900 Cases of Syphilis.—Zimmern (*Berl. klin. Wochenschr.*, August 21, 1911, p. 1,550) gives his experience of salvarsan in 1,900 cases, 1,000 of which received intramuscular or subcutaneous injections, and 870 intravenous. Relapses occurred in 5·6 per cent of the former, and in 4 per cent of the latter. These ratios, however, are under-estimated, since only about one-seventh of the patients could be kept under observation. In sixty-nine initial lesions, in most of which the diagnosis was confirmed by the detection of the *Treponema pallidum*, healing began two or three days after a dose given intravenously, and was completed in two or three weeks. The after-histories of twenty-four of these patients are known. Only five of them developed secondary symptoms. Since this abortive treatment of syphilis with "606" is of the greatest importance, it is interesting to compare Zimmern's results with those of other observers.

Knaur (*Wien. klin. Wochenschr.*, No. 13, 1911) observed secondaries in five out of fourteen cases; Grünfeld (*Arch. f. Derm. u. S.*, 1911, Bd. 105) in thirty-seven out of forty-six, Scholtz (*Berl. klin. Wochenschr.*, April 24, 1911, p. 78) in seven out of twenty; Milian (*Berl. klin. Wochenschr.*, May 29, 1911) in two out of twenty-five; Finger in twenty-two out of twenty-four; Isaak in fifteen out of eighteen. Zeissel, as well as Duboit, and Jadassohn claim to have aborted the infection by means of "606" in all the cases of primary syphilis which they treated. Zimmern punctured the enlarged glands of five subjects of primary syphilis who had received two doses of salvarsan. He observed the *T. pallidum* in one, though the Wassermann reaction was negative. He similarly investigated the gland juice of seven secondary cases, with positive results in two.

He concludes, therefore, that even energetic treatment with salvarsan will not always destroy the *T. pallidum*. Under the influence of the remedy he found that mucous tubercles and condylomata became dry in two days, and disappeared in eight or ten.

Ulcerations of mucous membranes healed in ten to twelve days. Rashes faded in two to five days, though there might remain a tendency to pigmentation. Herxheimer's reaction was frequently noted two to six hours after the injection. Tertiary affections of the mouth, tongue, and throat quickly responded, especially in those individuals who had undergone long courses of mercury and iodide without improving. Deep gummata and nodes were slower in disappearing. Out of seven cases of tabes, two alone were benefited. The remedy proved useless in general paralysis of the insane. Improvement was reported in a patient suffering from spastic spinal paralysis and in another, the victim of cerebral syphilis. In seven primary affections the Wassermann reaction remained constantly negative, and no subsequent symptoms developed. In two other cases, though the serum was negative, secondaries appeared. In later stages he obtained a change from positive to negative in 70 per cent of the bloods examined. In only one instance did he observe an alteration from negative to positive as the result of a dose of salvarsan. With regard to complications, Zimmern has not met with ill-effects to the kidneys, but he thinks that nephritis is a contra-indication. He has seen nervous symptoms arise in 1 per cent of his cases about two months after the last injection. A case of paralysis of the external rectus and double optic neuritis was improved by two doses of 0·4 grm. Another case of tinnitus aurium was benefited.

He administers three doses of salvarsan intravenously at intervals of a fortnight or three weeks, 0·4 to 0·5 grm. for a man, and 0·3 to 0·4 grm. for a woman in each. He combines this treatment with a course of mercurial injections.

C. B.

Excretion of Salvarsan in the Urine after Intravenous Injection.—Abelin (*Münch. med. Wochenschr.*, No. 33, 1911), using the nitric acid and alkaline resorcin test made a number of observations to determine how soon after an intravenous injection of salvarsan the drug begins to be excreted in the urine.

In all cases he found that the excretion begins within an hour or two of the injection, and in some a positive reaction was obtained in five to ten minutes after the injection. In most of the cases no reaction could be obtained longer than five to six hours after the injection. The test only reacts with unaltered salvarsan, and does not show the presence of other combinations of arsenic.

C. E. P.

Treatment of Syphilis by Repeated Doses of Salvarsan.—Kromayer (*Deut. med. Wochenschr.*, No. 34, 1911), after a large experience with Alt's, the paraffin emulsion and intravenous methods, takes exception to large single doses of salvarsan, and now advocates as a general rule a dose of 0·2 grm. injected intravenously three times a week. The total quantity he employs in each case has gradually risen from 1·2 grm in the earlier cases, to 3·6 grm. in the later ones. The length of the course varies with the total quantity injected, from two to six weeks.

The intravenous method is employed for out-patients, the only special precaution taken being to send them straight home and to bed for the remainder of the day. In the later injections the reaction is usually absent. Different veins should be selected for each injection.

As regards permanency of cure no definite statement can be made at present. Out of 365 cases treated with salvarsan, reliable information in regard to the recurrence of relapses was obtained from 138. The results were as follows:—

Of 60 patients treated with 0·6 to 1·1 grm. of salvarsan, but without mercury, 23 (= 39 per cent) had a relapse.

Of 31 patients treated with 0·5 to 1·1 grm. of salvarsan, and also with mercury, 11 (= 35 per cent) had a relapse.

Of 40 patients treated with 1·2 to 2·5 grm. of salvarsan, but without mercury, 5 (= 12 per cent) had a relapse.

Of 7 patients treated with 1·5 to 2·5 grm. of salvarsan, and also with mercury, none had a relapse.

Of the later patients treated with more than 1·6 grm. of salvarsan, none have had a relapse, although it must be remembered that these cases were treated in January to March of this year, and that consequently the interval since the treatment is a comparatively short one.

Seven patients treated in May, 1910, each with a single dose of 0·3 to 0·4 grm. of salvarsan, have all had relapses, in some of the cases these were very severe.

Kromayer concludes that to be efficient a large dose of salvarsan, up to 3·6 grm., must be employed, and that this should be administered in smaller single doses by intravenous injection during a period of several weeks. He also approves of the employment of mercury in addition to salvarsan.

C. E. P.

Deaths after Injection of Salvarsan.—(*Münch. med. Wochenschr.*, No. 34, 1911). Fischer reports the case of a man, aged 40, with a secondary rash, who received an intravenous injection of 0·4 grm. of salvarsan on March 20. This was followed by a moderate reaction and a general improvement in all his symptoms. Early in April he began a course of mercurial inunctions, which were well tolerated. Iodide of potassium was also given, but had to be stopped in a short time as it produced symptoms of intoxication. The patient completed a course of thirty inunctions, and five days later, on May 6, a second injection of 0·4 grm. of salvarsan was given intravenously. No unpleasant symptoms occurred for forty-eight hours, when he suddenly became comatose. His condition rapidly became worse and ended fatally seventy-two hours after the second injection. The autopsy revealed parenchymatous degeneration of the organs, slight leptomeningitis and small hæmorrhages into the superficial grey matter and basal ganglia of the brain.

Kannengieser (*id.*) reports another case. A man, aged 29, who had contracted syphilis in August, 1910. In December, 1910, he was given a subcutaneous injection of salvarsan, following six intramuscular injections of salicylate of mercury. On April 26, 1911, he had well marked secondary symptoms. On April 28, 1911, 0·5 grm. of salvarsan was injected intravenously, and next day a course of mercurial inunctions was begun. There was no reaction and all the symptoms rapidly improved, except that he complained of headache. On May 11, 1911, he received a second intravenous injection of 0·5 grm. of salvarsan; there was no reaction. On May 14, 1911, he suddenly had an epileptiform seizure, from which he did not recover, and died on May 16, 1911.

At the autopsy the conditions found were: double lobular pneumonia, fatty degeneration of the heart and kidneys, chronic leptomeningitis, small hæmorrhages into the superficial grey matter of the brain.

Almkvist, of Stockholm (*id.*), also reports a death after salvarsan injection, the first he has had among 184 cases. The patient, aged 32, contracted syphilis in May, 1905. During the following three years he underwent ten courses of mercurial treatment. In March, 1910, he had a fresh chancre, from which spirochætes were recovered; Wassermann reaction was positive. Up to July he had fifteen injections of mercuriol. In February, 1911, the Wassermann reaction was still positive. On February 16, he was given an intravenous injection of 0·6 grm. of salvarsan; this was followed by slight diarrhœa, but no other unpleasant symptom. On February 18 he had slight headache and next day severe vomiting. The same evening he was found unconscious and cyanosed. He only improved temporarily, and died on February 22. The principal lesion noted at the post-mortem examination consisted of numerous small hæmorrhages in the superficial grey matter of the brain.

C. E. P.

The Specific Treatment of Gonorrhœa.—Schmitt (*Berl. klin. Wochenschr.*, August 28, 1911, p. 1620) has employed two vaccines, a weak emulsion of gonococci, prepared by Reiter, and a stronger one sold under the name of arthigon. The former has the advantage of inducing a short negative and a long positive phase, but this does not attain the height of that which results from the larger dose. Good effects were observed in three cases of vulvo-vaginitis of children, in three of epididymitis, in prostatitis, cystitis, and rheumatism of gonorrhæal origin. Twelve out of twenty-four cases of infection of the cervix uteri recovered under this treatment; but no benefit was noted in gonorrhœal metritis. The injection of the more powerful vaccine caused severe local and general reactions.

Hanstein (*Arch. f. Derm. u. S.*, Bd. 106, 1911) finds that gonorrhœal rheumatism usually improves under vaccine therapy, and epididymitis sometimes. This treatment had little or no effect on the nature or duration of the discharge.

Hecht and Klausner (*Berl. klin. Wochenschr.*, May 15, 1911, p. 894), have treated sixteen cases with arthigon, and are impressed with its value in the complications of gonorrhœa, though it failed in three instances.

C. B.

Prophylaxis and Treatment of Gonorrhœal Ophthalmia Neonatorum.—Hörder (*Münch. med. Wochenschr.*, No. 31, 1911), states that Crédé's method of instilling a solution of nitrate of silver into the eyes of newly-born children reduced the incidence of this affection to 0·18 per cent. It, however, caused considerable irritation in about 30 per cent of the cases so treated. To obviate this other solutions, e.g., 10 per cent protargol, 1 per cent acetate of silver, and 5 to 10 per cent argyrol, were employed. These were found to be more efficient and less irritating.

The best results have been obtained with 10 per cent solutions of sophol (a formo-nucleinate of silver). Among 1,757 newly-born children there was not a single case of gonorrhœal ophthalmia during the first five days of life, and only 7 (= 0·3 per cent) suffered from the disease during the following three weeks. These babies were almost certainly infected through the mother's carelessness at some time subsequent to parturition. Only 39 (= 2·2 per cent) of the children showed signs of catarrhal inflammation due to irritation by the drug.

The conjunctivitis was treated with Blenolenizet ointment. This was applied to the lids every two hours at first, and later on every three hours. When gonococci were found in the conjunctival discharge, a 2 per cent solution of nitrate of silver was dropped in daily; as improvement proceeded the strength was reduced to 1, and later on to ½ per cent.

The solutions must be freshly prepared, as when kept the salt decomposes and sets up irritation.

C. E. P.

A Suggestion for the Estimation of the Physical Fitness of Soldiers.—Oberarzt Dr. Uhlirz (*Militärarzt*, No. 15, 1911), is a medical officer of the reserve and has thus had opportunities of seeing the work done by soldiers during their service, and also of observing men, who have been rejected as unfit for soldiering, when engaged in earning their livelihood as civilians. Many of these "unfit" men are able, without suffering any injury, to perform much harder work than they would be called on to do as soldiers, while many of the "fit" men appear to be hardly capable of carrying out the soldier's duties. He concludes that the present system of recruit inspection is faulty, and suggests that the test should be directed to ascertaining the capacity for work of the principal groups of muscles, and the effect of this on the body as a whole.

Uhlirz thinks that the test of fitness should be on the following lines: The man's pulse-rate and respirations per minute should be recorded. He should then be made to raise a weight of 1 kg., through a height of half a metre twenty times in one minute. This would be designated as the 10 kg.-metre test. The pulse-rate and respirations per minute should be noted immediately on completion of the test. The difference between the two records would afford an indication of the effect on the man's system.

The test might be varied either as regards the time required to perform a certain amount of muscular work or a different exercise might be ordered. In either case the time required for the pulse-rate and respirations to return to normal would afford a valuable guide as to the man's physical fitness. Many observations would have to be made before any standard could be set up.

C. E. P.

Detection of Typhoid Carriers among Recruits.—Stabsarzt Hüne (*Deut. Militärarzt Zeitschr.*, March 20, 1911), discusses this subject in a lengthy article, and describes the results obtained in Stettin. He lays down the following axioms: (1) In any body of recruits there are certain to be one or more typhoid carriers. (2) Close association in barrack rooms favours the spread of infection. (3) The exertions and exposure to chill incident to military service by lowering the man's vitality, favour the occurrence of auto-infection in the carrier as also the spread of infection to healthy men (4) The incidence of typhoid fever is always highest after the autumn manœuvres, this may in part be due to infection contracted from the civil population, but mainly to that derived from carriers.

In order to detect typhoid carriers among recruits Hüne suggests that: (1) Each recruit should be questioned as to whether he has himself had typhoid fever, or as to its recent occurrence in his home. Should the man have suffered from or been in contact with cases of typhoid fever during the preceding twelve months, his excretions should be bacteriologically examined for the presence of *Bacillus typhosus* on three occasions at intervals of one week. (2) If more than twelve months have elapsed since the date of exposure, a Widal's serum test should be made. If this is positive in dilutions of 1 in 40, or higher, his excretions must be bacteriologically examined.

Men who continue to excrete typhoid bacilli for more than three months should be invalided out of the service.

In Stettin, seventy-nine recruits had suffered from or been exposed to infection from typhoid fever. In ten cases the Vidal reaction was positive in dilutions of 1 in 40 or higher, and among these one carrier was detected.

C. E. P.

Preparations to be made in Anticipation of the Mobilization of Voluntary Aid Detachments of the (German) Red Cross Society. (*Der Deutsche Kolonnenführer*, No 17, of 1911).—The following notes are taken from a lecture delivered at the fifth annual meeting of the Commanding Officers and Doctors of Voluntary Aid Detachments of the district of Upper Bavaria.

The lecturer began by pointing out how important it is that the executive of each Voluntary Aid Detachment should be thoroughly acquainted with the steps to be taken when mobilization is ordered and that all the necessary preparations should be made in peace time.

He then drew their attention to the importance of rendering accurate annual returns of the effective strength of the detachment, and warned his audience especially against including men still liable to military service.

In the annual return members of a Voluntary Aid Detachment are classified into three groups.

(I) Field and reserve *personnel.* (Feld und Ersatzmannschaften). Before placing a man's name on this list the executive of the Voluntary Aid Detachments must satisfy themselves that he is:—

(1) Physically fit, not too old.

(2) Thoroughly trained.

(3) Likely to turn out when called on. The men in this group pledge themselves to serve for three months continuously on the line of communication if called on to do so.

II. Home territory *personnel.* (Heimatsmannschaften). Men belonging to this group must agree to serve away from their homes; their duty is to undertake the care of sick and wounded convoys within the home territory. They are not required to serve for three months continuously like the field *personnel.* Each Voluntary Aid Detachment must undertake to furnish one third of its total peace strength for service in these groups.

III. Local *personnel* (Ortsmannschaften). The men of this group are only liable for duty in their own locality. If they are in a besieged fortress they may be employed in the same way as the field *personnel.*

The central executive committee of the Voluntary Aid Detachments furnishes the Minister of War annually with a consolidated statement of the resources in *personnel* and equipment of the whole country. The Minister of War then informs the central committee as to the special preparations for war which he wishes the Society to undertake. The committee thereupon makes its plans (Ausführungsbestimmungen), and passes its demands to the district committees which in turn call upon the individual detachments, to be prepared to furnish certain *personnel* for special duties.

A mobile unit will only be mobilized at a centre where arrangements for the purpose have been made in peace time; in Bavaria, Munich is the only centre. Individual Voluntary Aid Detachments will therefore only be called on to furnish *personnel* as required. Uniform and equipment is stored in peace time by the detachment which is to carry out the mobilization. Men sent in by other detachments will be clothed and equipped in Munich, with the exception of boots, underclothing, water bottle and knife. A money allowance is given in place of boots.

In carrying out mobilization the mobilization time-table (Mobilmachungs-Terminskalender) must be strictly adhered to. As this is a confidential document it can only be referred to in general terms. In this time-table the dates which have been fixed by regulations are shown in Roman numerals, the days which may be employed by the executive of the Voluntary Aid Detachment according to their own discretion are shown in Arabic numerals. As an example, suppose that an ambulance train is to be mobilized by the 15th day of mobilization and a reserve ambulance train *personnel* by the 21st day. On the 1st or at latest 2nd day of the time-table, notice is to be sent to the detachment entrusted with carrying out the mobilization if any of the *personnel* allotted to the unit cannot be provided. The next Roman numeral would be found opposite the 6th day on which the detailed *personnel* has to report at the headquarters of the mobilizing detachment.

On the 15th day reports are to be furnished showing whether the reserve *personnel* is available or not.

On the 18th day *personnel* detailed for the reserve must report at the appointed place. The other dates are left free to be employed by the mobilizing unit as it thinks best.

To continue the above example. On the 1st day, the executive of the Voluntary Aid Detachments must make certain that the men selected for service on mobilization are actually available, and if not must warn the waiting men. Should it be impossible to find the full complement required, immediate notice must be sent to the mobilizing detachment.

On the 2nd day the selected men should be medically examined as to fitness.

On the 3rd day if the orders to join have not been received from the mobilizing detachment they must be demanded by letter. These orders afford free railway transport.

On the 5th day arrangements should be made with the railway authorities to ensure that the men will arrive on the fixed day at the mobilizing centre. Their underclothing and necessaries should be checked and their marching papers given out.

On the 6th day the men report at their centre and receive their clothing, brassards and their identity certificates and service books. The value of their boots will be assessed for compensation. All outer clothing brought with the men will be taken into store and returned to their own centre.

Days not specially appropriated will be used for instruction, to ensure that the men are thoroughly acquainted with their duties. The following arrangements should also be made by all executive committees when mobilization is ordered. (1) Make fresh appointments to replace men detailed to units on mobilization. (2) For the conversion of war reserve funds into cash. (3) Prepare war diary, mobilization accounts and correspondence book. (4) Complete the medical equipment, supply of brassards, &c. (5) Prepare the necessary certificates for members belonging to the *Landstrum* for transmission to the district commander.

Orders for mobilization will be officially posted up in each district giving the first day of mobilization.

C. E. P.

Correspondence.

"INEFFICIENCY, RESULTING FROM BREAD-CUTTING IN THE ARMY."

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Within the past thirty days no less than nine cases of injury to the left thumb have been treated by me, all resulting from careless use of the present "guillotine" bread-cutter.

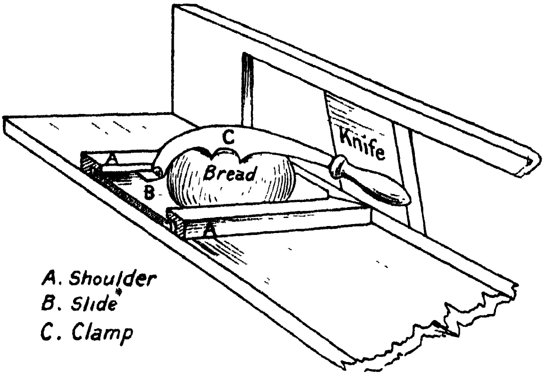
Some of the injuries were so severe that admission to hospital was necessary; the injuries varied from complete amputation of the top of the thumb through the terminal phalanx, to slices of skin and even muscle taken off the thenar eminence.

In these cases healing by granulation is all that can be hoped for, and their absence from duty may be a matter of weeks.

The advice to be more careful is as wasted as seed upon stony ground, and, judging from my own experience, the number of men rendered temporarily unfit from these accidents, taken on an annual basis, must be considerable.

I should be much interested to hear from medical officers in charge of units whether their experience of these cases is similar, and roughly how many cases they have seen. In conclusion, I would suggest a remedy: the bacon guillotine, for cutting rashers of bacon, has a clamp for holding the bacon to be cut; if a similar arrangement could be applied to the bread-cutter we should prevent a considerable number of men from becoming temporarily inefficient.

A simple addition to the present machine might be devised on the lines shown in the diagram:—



The two wooden shoulders marked "A" in diagram hold a wooden slide "B" which carries a serrated clamp "C"; this holds the loaf in position.

Newbridge,
October 21, 1911.

I am, &c.,
E. L. Moss,
Captain, R.A.M.C.

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RE-EMPLOYED RETIRED OFFICERS,

AND

MEDICAL OFFICERS OF THE HOUSEHOLD TROOPS.

1st OCTOBER, 1911.

[This List is prepared according to the latest information contained in Official Returns. Officers are requested to register any Diplomas or special qualifications at Headquarters, War Office, in order that the list may be published as complete as possible.]

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Colonel (temp. Surgeon-General)	Babtie, W., V.C., C.M.G., M.B.	Deputy Director-General, Army Medical Service.
Colonel	O'Keeffe, M. W., M.D.	Inspector of Medical Services.
Lieutenant-Colonel .	Burtchaell, C. H., M.B.	Assistant Director-General, Army Medical Service.
,, ,, ..	Eckersley, E., M.B.	Deputy Assistant Director-General, Army Medical Service.
,, ,, ..	Scott, B. H.	Deputy Assistant Director-General, Army Medical Service.
Major . ..	Birrell, E. T. F., M.B.	Deputy Assistant Director-General, Army Medical Service.
,, ...	Pollock, C. E.	Deputy Assistant Director-General, Army Medical Service (attached to the Department of the Director of Military Operations).

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Lieutenant-Colonel (Brevet-Colonel)	Horrocks, W. H., M.B.	Expert in Sanitation.

ROYAL ARMY MEDICAL COLLEGE.

Rank.	Name.	Appointment.
Colonel	Risk, E. J. E.	Commandant and Director of Studies.
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,, ...	Harrison, W. S., M.B.	,, Tropical Medicine.
Lieutenant-Colonel .	Melville, C. H., M.B.	,, Hygiene.
Major (Brevet-Lieutenant-Colonel)	Leishman, Sir W. B., Knt., F.R.S., M.B.	,, Pathology.
Major	Wanhill, C. F.	Assistant Professor of Hygiene.
Captain	Kennedy, J. C., M.D.	,, ,, Pathology.
Major	Gibbard, T. W., M.B.	Lecturer in Syphilology.

SURGEON-GENERALS.

Name.	Station.	Appointment.
Bourke, G. D., C.B., K.H.P.	Dublin	Principal Med. Officer, Irish Command.
Dorman, J. C., C.M.G., M.B., K.H.P.	London	,, ,, ,, Eastern Command.
Kenny, W. W., M.B., F.R.C.S.I., K.H.S.	York	,, ,, ,, Northern Command.
Lloyd, O. E. P., V.C., C.B.	Pretoria	,, ,, ,, South Africa.
MacNeece, J. G., C.B.	Lucknow	,, ,, ,, 8th (Lucknow) Division.
Robinson, G. W., C.B.	Aldershot	,, ,, ,, Aldershot Command.
Sloggett, A. T., C.B., C.M.G.	Poona	,, ,, ,, 6th (Poona) Division.
Trevor, F. W., C.B., M.B. K.H.S.	Simla	,, ,, ,, His Majesty's Forces in India.
Whitehead, H. R., C.B., F.R.C.S.	Salisbury	,, ,, ,, Southern Command.

COLONELS.

Name	Station.	Appointment.
Anderson, L. E.	Bareilly	P.M.O., Bareilly, Garhwal, and Dehra Dun Brigades.
Babtie, W., V.C., C.M.G., M.B. (temp. Surg.-Gen.)	War Office	Deputy Director-General Army Medical Service.
Bedford, W. G. A., C.M.G., M.B.	Hong Kong	P.M.O., South China.
Birrell, W. G., M.B.	Dover	A.M.O., Eastern Command.
Bruce, Sir D., Knt., C.B., F.R.S., M.B., F.R.C.P.	London	Expert in Tropical Diseases, Army Medical Advisory Board
Butt, E., F.R.C.S.I.	Calcutta	P.M.O., Presidency and Assam Brigades
Corker, T. M., M.D.	Cairo	P.M.O., Egypt.
Culling, J. C.	Chester	P.M.O., Western Command.
Dodd, J. R., M.B., F.R.C.S.	Cork	A.M.O., Irish Command.
Ford, R. W., D.S.O.	Woolwich	A.M.O., Eastern Command and Officer in Charge Royal Herbert Hospital.
Forman, R. H., M.B.	Bombay	P.M.O., Bombay Brigade.
Hackett, R. I. D., M.D.	Karachi	P.M.O., Karachi Brigade
Hathaway, H. G.	Portsmouth	A.M.O., Southern Command.
Jencken, F. J., M.B.	Colchester	A.M.O., Eastern Command.
Jennings, R., M.D., K.H.S.	Devonport	A.M.O., Southern Command
Johnston, H. H., C.B., M.D.	Gibraltar	P.M.O., Gibraltar.
Kerin, M. W., C.B.	Mussoorie	P.M.O., 7th (Meerut) Division.
Lambkin, F. J.	Bloemfontein	A.M.O., South Africa.
Lucas, T. J. R., C.B., M.B.	Jubbulpore	P.M.O., Jubbulpore and Jhansi Brigades.
Macpherson, W. G., C.M.G., M.B.	Quetta	P.M.O., 4th (Quetta) Division.
Moberly, H. J. R.	Bangalore	P.M.O., Bangalore and Southern Brigades.
O'Donnell, T. J., D.S.O.	Tidworth	A.M.O., Southern Command.
O'Keeffe, M. W., M.D.	War Office	Inspector of Medical Services.
Peterkin, A., M.B.	London	P.M.O., London District.
Porter, R., M.B.	Malta	P.M.O., Malta.
Risk, E. J. E.	R.A.M. College	Commandant and Director of Studies.
Robinson, S. C. B.	Cherat	P.M.O., 1st (Peshawar) Division.
Sawyer, R. H. S., M.B., F.R.C.S.I.	Dublin	A.M.O., Irish Command.
Treherne, F. H., F.R.C.S. Edin.	India	(On voyage out).
Woodhouse, T. P.	Edinburgh	P.M.O., Scottish Command.

ROYAL ARMY MEDICAL CORPS.

LIEUTENANT-COLONELS.

Name.	Station.	Appointment.	Special Qualifications.
Adams, G. G.	Colaba	Officer in charge Military Hospital	—
Adamson, H. M., M.B.	Newcastle	Offi. in ch. Mty. Hosp. and S.M.O. North-Eastern Coast Defences	—
Aldridge, A. R., M.B.	Aldershot	Instructor, School of Army Sanitation	2.
Allen, S. G.	Gibraltar	Officer in charge Military Hospital and O.C. 28th Coy. R.A.M.C.	2.
Barefoot, G. H.	Ranikhet	Officer in charge Military Hospital	—
Barratt, H. J.	Straits Settlements	S.M.O. and O.C. 32nd Company R.A.M.C.	2.
Bate, A. L. F.	Kuldana	Officer in charge Military Hospital	—
Beevor, W. C., C.M.G., M.B.	Bangalore	Officer in charge Military Hosp.	—
Berryman, W. E.	Woking	,, ,, ,, ,,	—
Birt, C.	Dublin	Officer in charge Royal Infirmary and O.C. 14th Company R.A.M.C.	—
Blackwell, C. T., M.D.	Rangoon	Officer in charge Military Hospital	2.
Braddell, M. O'D., M.B.	Rawal Pindi	.. ..	—
Brown, E. G.	Delhi	Officer in charge Military Hospital	2.
Brown, H. H., M.B.	Murree	,, ,, ,, ,,	—
Burnside, E. A.	Golden Hill	,, ,, ,, ,,	—
Burtchaell, C. H., M.B.	War Office	Assistant Director-General, Army Medical Service	2.
Burton, F. H. M., M.D.	Colchester	Officer in charge Military Hospital and O.C. 9th Coy. R.A.M.C.	—
Caldwell, R., F.R.C.S.	Pretoria	Officer in charge Military Hospital and O.C. 23rd Coy. R.A.M.C.	2.
Carr, H., M.D.	Jullundur	Officer in charge Military Hospital	—
Cocks, H., M.B.	Shorncliffe	.. ..	—
Cottell, R. J. C.	Chelsea	Physician and Surgeon Royal Hosp.	8.
Cree, G.	London	Medical Inspector of Recruits, Eastern Command	—
Cree, H. E.	Sabathu	Officer in charge Military Hospital	—
Daly, J. H.	Limerick	,, ,, ,, ,,	—
Daly, T.	Peshawar	,, ,, ,, ,,	—
Davidson, J. S., M.B.	Allahabad	,, ,, ,, ,,	—
Dodd, A.	Chester	Offi in ch. Mty. Hosp., O C. 19th Coy. R.A.M.C., and S.M.O. North-Western Coast Defences	—
Donaldson, J.	Aldershot	Offi. in charge Isolation Hospital	—
Donegan, J. F.	Woolwich	Recruiting duties	—
Donnet, J. J. C.	Belfast	Officer in charge Military Hospital and O.C. 15th Coy. R.A.M.C.	—
Eckersley, E., M.B.	War Office	Deputy Assistant Director-General, Army Medical Service	2.
Elkington, H. P. G.	Exeter	Officer in charge Military Hospital	2.
Fallon, J.	Preston	,, ,, ,, ,,	—
Faunce, C. E.	Chatham	A.M.O., Eastern Command	—
Ferguson, N. C., C.M.G., M.B.	London	Q. A. Military Hospital	2.
Firth, R. H., F.R.C.S. (Brevet-Colonel)	Simla	Sanitary Officer, Army Headquarters	2.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications
Fletcher, H. J., M.B.	Sialkot	.. ..	—
Geddes, R. J., D.S.O., M.B.	Jubbulpore	Officer in charge Military Hospital	2.
Gerrard, J. J., M.B.	York	Medical Inspector of Recruits N.C.	—
Gordon, P. C. H.	Pembroke Dock	Officer in charge Military Hospital and S.M.O. Western Coast Defences	2.
Gordon-Hall, F. W. G., M.B.	Glasgow	.. ..	2.
Gray, W. L., M.B.	Winchester	Officer in charge Military Hospital	—
Green, J. S., M.B.	Naini Tal	,, ,, ,, ,,	—
Gubbin, G. F.	Curragh	,, ,, ,, ,, and O.C. 17th Coy. R.A.M.C.	2.
Haines, H. A., M.D.	Chatham	Officer in charge Military Hospital, and O.C. 10th Coy., R.A.M.C., S.M.O., Eastern Coast Defences	—
Hale, C. H., D.S.O.	Kamptee	Officer in charge Military Hospital	—
Hale, G. E., D S.O.	Mhow	,, ,, ,, ,,	—
Hall, R. H., M.D.	Bermuda	S.M.O., O.C. R.A.M.C., and in charge Military Hospital Prospect	—
Hamilton, T. W. O'H., C.M.G., M.B.	Warley	Officer in charge Military Hospital	-
Hanley, R. G., M.B.	Bloemfontein	Officer in charge Military Hospital, and O C 24th Coy., R.A.M.C.	—
Hearn, M. L.	Dublin	Medical Inspector of Recruits Irish Command	—
Henderson, R S. F., K.H.P., M.B (Brevet-Colonel)	Simla	Sec. to P.M O., H M.'s Forces in India	-
Heuston, F. S., C.M.G., F.R.C.S.I.	Edinburgh	Offi. in charge Military Hospital, O.C. 13th Coy. R A.M.C., and S.M O. Scottish Coast Defences	—
Hickson, S., M.B	Wynberg	Officer in charge Military Hospital, and O.C. 22nd Coy. R.A.M.C.	—
Holt, M. P. C., D.S.O.	Kasauli	Officer in charge Military Hospital and Civil Station Hospital	5.
Holyoake, R.	Sheerness	Officer in charge Military Hospital	—
Horrocks, W. H., M.B. (Brevet-Colonel)	London	Expert in Sanitation Army Medical Advisory Board	2.
Hunter, G. D., D.S.O.	Aldershot	O.C. Depôt, School of Instruction, and in charge of Records, R.A.M.C	—
Irwin, J. M., M.B.	Tientsin	S.M.O. and O.C. R A.M.C , North China	—
Johnson, C. W., M.B.	Bulford	Officer in charge Military Hospital	—
Jones, F. W. C., M B	Quetta	,, ,, ,, ,,	—
Julian, O. R. A., C.M.G.	Dublin	,, ,, ,, ,, Portobello	2.
Kennedy, A.	Netley	Offi. in charge "D" Block	—
Kirkpatrick, R., C.M.G., M.D.	Devonport	,, ,, Mty. Hosp., O.C. 7th Coy. R.A M.C., and S.M.O. South Western Coast Defences	—
Knaggs, H. T., M.B.	Alexandria	Officer in charge Military Hospital and O.C. 24th Coy. R.A.M.C.	2.
Lane, C. A., M B.	Hounslow	Officer in charge Military Hospital	—
Lavie, T. G.	Queenstown	,, ,, ,, ,,	—
Le Quesne, F. S., V.C.	Woolwich	,, ,, Auxiliary Hospital	—
Lilly, A T. I.	Belgaum	Officer in charge Military Hospital	—
Lynden-Bell, F. H. L., M.B	Meerut	,, ,, ,, ,,	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4 Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology
9 Diploma in Tropical Medicine.
10 Skiagraphy.
11. Psychological Medicine.
12 Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment	Special Qualifications.
McCulloch, T., M.B.	Calcutta	Officer in charge Military Hospital	—
MacDonald, C. J., M.D.	N. China	(On voyage out)	—
Macdonald, S., M.B.	London	Recruiting duties	—
McGill, H. S.	Secunderabad	Officer in charge Military Hospital	2.9.
Macleod, R. L. R., M.B.	Aden	,, ,, ,, ,,	2.
Maher, J.	London	,, ,, Queen Alexandra Military Hospital and O.C. 35th Coy. R.A.M.C.	—
Manders, N.	Ceylon	S.M.O., In ch Mty. Hosp. Colombo. and O.C. 26th Coy. R.A.M.C.	—
Marks, G. F. H., M.D.	Ferozepore	Officer in charge Military Hospital	—
Mathias, H. B., D.S.O. (local Colonel)	Egypt	P.M.O. Egyptian Army	—
Meek, J., M.D.	Cosham	Offi. in ch. Mty. Hosp., O.C. 6th Coy. R A.M.C., and S.M.O. Southern Coast Defences.	2.
Melville, C. H., M.B.	R.A.M. College	Professor of Hygiene	2.
Moore, R. R. H., M.D.	Belfast	A.M.O. Irish Command, and S.M.O. North Irish Coast Defences	—
Morgan, F. J.	Barrackpore	Officer in charge Military Hospital	—
Morgan, J. C.	Glasgow	,, ,, ,, ,,	2.
Morris, A. E., M.D.	Cork	Officer in charge Military Hospital, O.C. 16th Coy. R.A.M.C., and S.M.O. South Irish Coast Defences	—
Morris, W. A.	Cawnpore	Officer in charge Military Hospital	—
Nash, L. T. M.	Karachi	.. ..	—
Newland, F. R., M.B.	York	Staff Officer to P.M.O. Northern Command	—
Nichol, C. E., D S O., M B.	Maymyo	Officer in charge Military Hospital	
Nichols, F. P., M.B.	Jersey	S.M.O. and in charge Military Hosp., Fort Regent	
Noding, T. E.	Hilsea	Officer in charge Military Hospital	—
O'Callaghan, D. M.	Aldershot	,, ,, Surgical Wards, Cambridge Hospital	—
O'Connell, D. V., M.D.	Shorncliffe	Officer in charge Military Hospital	2.
O'Halloran, M., M.D.	Canterbury	.. ..	—
Penton, R. H., D.S.O.	Poona	.. ,, .. ,,	2.
Philson, S. C.	Bareilly	.. ,, ,, ..	—
Pike, W. W., D.S.O., F.R.C S.I.	Cairo	,, ,, ,, ,, and O.C. 33rd Coy. R.A.M.C.	
Reade, W. L.	Mauritius	S.M.O. and O.C. 31st Coy. R.A.M C.	—
Reilly, C. C.	Sandhurst	Surgeon Royal Military College	—
Ritchie, J., M.B.	Dalhousie	Officer in charge Military Hospital	—
Rowan, H. D., M.B.	Tidworth	Officer in charge Military Hosp. and O.C. 20th Coy. R.A M.C.	-
Russell, A. F., C.M.G., M.B.	Malta	Officer in charge Military Hospital, Cottonera, and O.C. 30th Company R.A.M.C.	—
Russell, J. J., M.B.	Salisbury	Staff Officer to P.M.O. Southern Command	—
Russell, M. W.	London	Staff Officer to P.M.O. Eastern Command	—
Salvage, J. V., M.D.	Muttra	.. ..	2.
Scott, B. H.	War Office	Deputy Assistant Director-General Army Medical Service	2.
Sexton, M. J., M.D.	Dublin	Officer in charge Military Hospital, Arbor Hill	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Shine, J. M. F., M.D.	Fyzabad	Officer in charge Military Hospital	—
Simpson, R. J. S., C.M.G., M.B.	Woolwich	„ „ Medical Division, Royal Herbert Hospital	—
Skinner, B. M., M.V.O.	Rawal Pindi	Officer in charge Military Hospital	—
Sloggett, H. M.	Malta		—
Starr, W. H.	Lichfield	Officer in charge Military Hospital	—
Sutton, A. A., D.S.O.	West Africa	Senior Medical Officer	—
Swan, W. T., M.B.	Netley	Offi. in charge Royal Victoria Hosp.	—
Tate, A. E.	Ambala	Officer in charge Military Hospital	—
Thompson, H. N., D.S.O., M.B.	Lucknow	„ „ „ „	—
Thurston, H. C., C.M.G.	Bermuda	Officer in charge Military Hospital, St. George's	—
Trevor, H. O.	Jamaica	S.M.O. and O.C. 29th Coy. R.A.M.C.	—
Turner, W.	York	Offi. in charge Military Hospital, and O.C. 8th Coy. R.A.M.C.	—
Tyrrell, C. R.	Bordon	A.M.O. Aldershot Command	—
Westcott, S., C.M.G.	Chakrata	Officer in charge Military Hospital	2.
Whaite, T. Du B., M.B.	Woolwich	S.M.O., Royal Arsenal	—
Will, J., M.B.	Richmond	Staff Officer to A.M.O. Northumbrian Div. Territorial Force	—
Wilson, G., M.B.	Dover	Officer in charge Military Hospital O.C. 11th Coy. R.A.M.C., and S.M.O. South Eastern Coast Defences	—
Wilson, J. B., M.D.	Woolwich	Officer in charge Surgical Division, Royal Herbert Hospital	—
Windle, R. J., M.B.	Dublin	Physician and Surgeon Royal Hospital, Kilmainham, and Medical Officer Royal Hibernian School	—
Winter, T. B.	London	Recruiting duties	2.
Wright, R. W.	India	(On voyage out)	—
Yarr, M. T., F.R.C.S.I.	Edinburgh	Medical Inspector of Recruits, Scottish Command	7.

MAJORS.

Addams-Williams, L.	Tidworth	Company Officer	—
Alexander, J. D., M.B.	Darjeeling	Officer in charge Military Hospital	—
Anderson, E. C., D.S.O.	Karachi		—
Anderson, H. S.	Moore Park Camp	Officer in Medical charge Troops	—
Anderson, J. B.	Southampton	Embarkation Medical Officer	3.
Archer, G. J. S., M.B.	Maymyo		5.
Archer, S. A.	Jullundur	Staff Surgeon	7.
Ashe, F.	Secunderabad	Spec. in Midwifery and Diseases of Women and Children	8.
Austin, J. H. E.	London	Recruiting Duties	—
Austin, R. F. E.	Kasauli		—
Babington, M. H.	Malta	Clinical Pathologist, Cottonera	3.
Barnett, K. B., M.B., F.R.C.S.I.	Shorncliffe		12.
Barrow, H. P. W.	Jamaica	Sanitary Officer	2.3.9.
Beach, T. B.	Cairo	Company Officer	—
Begbie, F. W.	Colchester		—
Berryman, H. A.	Chester		10.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Beveridge, W. W. O., D.S.O., M.B.	London District	Offi. in Med. ch. Troops Kensington Barracks, and Spec. in San.	2.
Bewley, A. W.	Landour	Officer in charge Military Hospital	—
Beyts, W. G.	Ranikhet		—
Birrell, E. T. F., M.B.	War Office	Deputy Assistant Director General Army Medical Service	7.
Blackham, R. J.	Peshawar	Sanitary Officer, 1st Division	2.8.
Blackwell, W. R.	Lucknow	Staff Surgeon	—
Blenkinsop, A. P. (Brevet Lieutenant-Colonel)	R.A.M. College	Assistant to Commandant and O.C. Det. R.A.M.C.	—
Bliss, E. W.	Quetta	Spec. in Advanced Operative Surg.	5.
Bond, J. H. R.	Nasirabad		
Bourke, E. A.	Cape Town	Embarkation Medical Officer	2.15.
Bowen, A. W. N.	Kirkee	Officer in charge Military Hospital	-
Boyle, M., M.B.	Leeds	„ „ „ „	10.
Brakenridge, F. J.	Oxford	„ „ „ „	1.2.
Bray, G. A. T.	Maidstone	„ „ „ „	—
Bray, H. A.	Woolwich		-
Brodribb, E.	Hythe	Officer in charge Military Hospital. Specialist in Ophthalmology	7.
Brogden, J. E.	Gibraltar		-
Browne-Mason, H. O. B.	Poona		4.
Buchanan, G. J., M.B.	Agra	Officer in charge Military Hospital	—
Buist, H. J. M., D.S.O., M.B.	Pretoria	Company Officer	—
Buist, John. M., M.B.	Netley	Officer in charge Special Reserve	2.3.9.
Bullen, J. W., M.D.	Wellington	Officer in charge Military Hospital	2.
Buswell, F. R.	Jubbulpore		—
Butler, S. G.	Pretoria	Spec. in Advanced Operative Surg.	5.
Campbell, J. H., D.S.O.	London	Recruiting Duties	8.
Carroll, F. F., M.B.	Egypt	Egyptian Army	5.
Carter, G. B., M.B.	Maymyo		—
Carter, J. E., M.B.	Chatham		2.
Chambers, A. J.	Pretoria	Staff Officer to P.M.O., S. Africa	—
Chopping, A.	Cherat	Officer in charge Military Hospital and Staff Surgeon	15.
Clark, E. S., M.B.	Holywood	Officer in charge Military Hospital	15.
Clark, S. F., M.B.	Chester	Medical Inspector of Recruits, Western Command	2.
Clarke, T. H. M., C.M.G., D.S.O., M.B.	Salisbury	Medical Inspector of Recruits Southern Command	—
Clements, R. W., M.B.	Wellington	Sanitary Officer, 9th Division	2.9.10.
Cochrane, E. W. W., M.B.	Bermuda	Sanitary Officer	2.3.
Collingwood, P. H.	Devonport		—
Collins, D. J., M.D.	Dublin	Sanitary Officer, Dublin District	2.7.
Condon, E. H., M.B.	Cardiff	Officer in charge Military Hospital	—
Connolly, E. P.	Cardiff	Adjutant School of Instruction, R.A.M.C. T.F.	—
Connor, J. C., M.B.	Bangalore		—
Copeland, R. J., M.B.	Darjeeling		—
Corkery, M. P.	Mount Abu	Officer in charge Military Hospital, also in Medical charge Lawrence School, and Residency Surgeon	1.
Cowan, J., M.B.	Woolwich	Clinical Pathologist	3.
Crawford, G. S., M.D.	Curragh		2.9.
Crawford, V. J.	Mauritius	Officer in ch. Mil. Families' Hosp. *Curepipe*	8.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name	Station.	Appointment.	Special Qualifications.
Crisp, G. B.	Mhow	Staff Offi. for Med. Mobilis'n. Stores	—
Cumming, C. C., M.B.	R.A.M. College		3.
Cummins, S. L., M.B.	R.A.M. College		3.9.
Cunningham, R.A., M.B.	Allahabad	Officer in charge Bde. Lab., Spec. in Prev. of Disease	2.
Curme, D. E.	Ewshott	Officer in charge Detention Hosp.	—
Dalton, C.	Dublin	Staff Offi. to P.M.O. Irish Command	—
Dansey-Browning, G.	Aldershot	Assistant Sanitary Officer	2.9.
Delap, G. G., D.S.O.	Aldershot	O.C. "B" Coy. Depôt, R.A.M.C., and Assistant Instructor Training School	—
Douglas, H. E. M., V.C., D.S.O.	London	Clinical Asst. Q.A. Mil. Hosp.	2.
Dunn, H. N., M.B.	Dagshai	Offi. in ch. Mil. Hosp.	—
Ellery, E. E.	Cairo		5.
Elliott, C. R., M.D.	Lahore	San. Officer, 3rd (Lahore) Division	2.
Elsner, O. W. A.	Pretoria		2.
Ensor, H., D.S.O., M.B.	Egypt	Egyptian Army	3.
Erskine, W. D., M.B.	Glasgow	Staff Officer to A.M.O., Lowland Division T.F.	—
Evans, C. R.	Malta		—
Evans, P., M.B.	Devonport	Spec. in Advanced Operative Surg.	2.5.15.
Faichnie, F. G.	London District	Officer in Medical charge Troops Chelsea Barracks	—
Faichnie, N., M.B.	Mhow	Divisional Sanitary Officer	2.9.
Fairrie, S. H., M.B.	Shoeburyness	Officer in charge Military Hospital	8.
Falkner, P. H., F.R.C.S.I.	Bermuda	Officer in charge N.D. Hospital, Watford	-
Fawcus, H.B., M.B.	Bloemfontein	Sanitary Officer Tempe	1.2.
Fell, M. H. G.	Cairo	Sanitary Officer	2.9.
Ferguson, J. D., D.S.O	London	Recruiting Duties	—
Fleury, C. M.	Hong Kong	Offi. in ch. Mil. Hosp., Kowloon	10.
Forde, B., M B.	Aldershot		2.
Forrest, J. V., M.B.	Cairo	Offi. in Med. ch. Troops Kasr-el-Nil	—
Fowler, C. E. P., F.R.C.S.	Gibraltar	Sanitary Officer	2.7.
Fox, A. C.	Tientsin	Officer in ch. Mil. Hosp.	8.
French, H. C.	Malta	,, ,, ,, Imtarfa	2.4.
Fuhr, R. S. H., D.S.O.	Woolwich	Officer in ch. Mil. Families' Hosp.	8.
Gallie, J. S.	London	Medical Officer of the Tower	—
Gibbard, T. W., M.B.	London	Officer in charge Military Hospital, Rochester Row, Lecturer in Syphilology R.A.M. College, and O.C. 18th Coy. R.A.M.C.	7.
Gill, J. G.	Peshawar	Spec. in Ophthalmology, 1st Div.	—
Girvin, J.	Ahmednagar	Officer in charge Military Hospital	—
Goddard, G. H.	Shorncliffe	,, ,, "Helena" Families' Hospital	8.
Goldsmith, G. M., M.B.	Maymyo		—
Goodwin, T. H. J. C., D.S.O.	Aden		5.10.
Graham, W. A. S. J.	Neemuch	Offi. in ch. Military Hospital	—
Grattan, H. W.	Lucknow	Sanitary Officer 8th Division	2.3.
Grech, J.	Warrington	Officer in charge Military Hospital	10.
Green, S. F. St. D., M.B.	Aldershot	Officer in charge Louise Margaret Hospital	8.
Gunter, F. E., M.B.	Lucknow		5.
Gwynn, W. P.	Quetta		—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Hall, S. O.	Fermoy	Officer in charge Military Families' Hospital	8.
Hallaran, W., M.B.	Jhansi	Officer in charge Military Hospital	—
Hardy, F. W., M.B.	Colchester	San. Officer Eastern Command	2.
Hardy, W. E.	Caterham	Officer in charge Military Hospital	—
Harrison, L. W., M.B.	London	Clinical Pathologist Military Hospital, Rochester Row	3.
Harrison, W. S., M.B.	R.A.M. College	Professor of Tropical Medicine	3.
Hartigan, J. A., M.B.	N. China	(On voyage out)	—
Harvey, D., M.B.	Naini Tal		1.
Harvey, F.	Devonport		2.3.9.
Hassard, E. M.	Lahore	Officer in charge Military Hospital	—
Hayes, E. C.	Cosham	Sanitary Officer Portsmouth Dist.	2.7.
Healey, C. W. R.	Nasirabad	Officer in charge Military Hospital	—
Heffernan, F. J C., F.R.C.S.I.	India	(On voyage out)	—
Hennessy, J., M.B.	Poonamallee	Officer in charge Military Hospital	—
Herrick, H.	Hyderabad	Specialist in Dermatology, Officer in charge Military Hospital	—
Hewetson, H.	Mill Hill	Officer in charge Military Hospital	1.2.
Hewitt, E. P.	Secunderabad		—
Hime, H. C. R., M.B.	Madras	Officer in charge Military Hospital and Bde. Lab , Spec. in Prevention of Disease	2.7.
Hinge, H. A.	London	Recruiting Duties	—
Hodgson, J. E.	London	Officer in Medical charge Troops Wellington Barracks	1.
Hooper, A. W., D.S.O.	Shorncliffe		—
Houghton, J. W. H., M.B.	Aldershot		2.
Howell, H. A. L.	London	Med. Offi. R.A.C. Factory, Pimlico	15.
Hudleston, W. E.	Portsmouth		2.15.
Humphry, L.	Poona	Specialist in Advanced Oper. Surg.	5.
Inkson, E. T., V.C.	Bangalore	Specialist in Dermatology	—
Inniss, B. J.	Gravesend	Officer in charge Military Hospital	—
Irvine, F. S., M.B.	Aldershot	Adjutant Depôt R.A.M.C.	—
Jameson, J. C., M.B.	Woolwich		2.
Johnson, H. P., M.D., M.R.C.P.Lond.	Bloemfontein		—
Jones, T. P., M.B.	Woolwich	Registrar Royal Herbert Hospital and O.C. 12th and 34th Coys. R.A.M.C.	—
Keble, A. E. C.	Gibraltar	Offi. in ch. Mty. Families' Hosp.	2.8.
Kelly, J. F. M., M.B.	Potchefstroom	Officer in charge Military Hospital	—
Kiddle, F., M.B.	London	Deputy Surgeon R. Hosp., Chelsea	7.
Killery, St. J. B.	Jersey	Officer in charge Military Hospital. Elizabeth Castle	—
Knox, E. B., M.D.	Norwich		2.
Langstaff, J. W.	Aldershot		—
Lauder, T. C., M.B.	Kinsale	Officer in charge Military Hospital	2.9.
Lawson, C.B., M.B.	Netley	Officer in charge Surgical Division	5.10.
Lawson, D.	Netley	,, ,, Venereal ,,	—
Leake, J. W.	W. Africa	(On voyage out)	1.2.
Leishman, Sir W. B., Knt., F.R.S., M.B. (Brevet-Lieut.-Col.)	R.A.M. College	Professor of Pathology	—
Lewis, R. C.	Pembroke Dock		—
LLoyd, L. N., D.S.O.	London	Adjutant School of Instruction, R.A.M.C. T.F.	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Lloyd, R. H.	Exeter	Adjutant School of Instruction R.A.M.C. T.F.	—
Longhurst, B. W.	Ashton	Officer in charge Military Hospital	16.
Lowsley, M. M.	Ambala	Staff Surgeon and in civil Medical Charge Cantonment.	8.
Luther, A. J.	Cahir	Officer in charge Military Hospital	—
MacCarthy, I. A. O.	Woolwich		—
McCarthy, J. McD., M.B.	Multan		1.2 9.
McDermott, T., M.B.	Woolwich	Specialist in Ophthalmology	7.
McDonnell, E., M.B.	Bermuda		—
MacDougall, A. J., M.B.	Ceylon	Sanitary Officer	3.
McKenzie, T. C., D.S.O.	Egypt	Egyptian Army	—
McKessack, P., M.B.	Mauritius	Officer in charge Military Hospital, Curepipe, Sanitary Officer	2.3.
MacLaughlin, A. M., M.B.	Edinburgh	Sanitary Offi. Scottish Command	1.2.
McLoughlin, G. S., D.S.O., M.B.	Southern Command		—
McMunn, J. R.	Netley	Registrar	15.
McNaught, J. G., M.D.	Cape Town	Sanitary Offi. Cape Good Hope and Orange Free States Districts	2.
Macpherson, J. D. G., M.B.	Pachmarhi	Officer in charge Military and Cantonment Hospital	—
Mainprise, C. W.	Rawal Pindi		—
Mangin, F. M.	Aldershot	In ch. Medical Wards Cambridge Hosp., Spec. in Ophthalmology	7.
Mansfield, G. S., M.B.	Norwich	Officer in charge Military Hospital	-
Marder, N.	Portland	,, ,, ,, ,,	-
Marriott, E. W. P. V.	Gibraltar		10.
Martin, C. B., M.B.	Netley	Officer in charge Medical Division	—
Martin, H. G.	Lebong	Officer in charge Military Hospital	8.
Martin, J. F., M.B.	Sandhurst	Assistant Surgeon R.M. College	2.
Master, A. E., M.B.	Woolwich	Medical Officer Royal Arsenal	14.
Matthews, J.	Karachi	Spec. in Ophthalmology. Staff Surgeon	7.
Maurice, G. T. K.	Tidworth		12.
Mawhinny, R. J. W.	Athlone	Officer in charge Military Hospital	2.
Milner, A. E.	Birmingham	Recruiting Duties	10.
Mitchell, L. A., M.B.	Aldershot		—
Moore, G. A., M.D.	Chatham	Officer in charge Mil. Fam. Hosp. and Specialist in Otology	14.
Moores, S. G.	Aldershot	Staff Officer to P.M.O. Aldershot Command	2.
More, L. P., M.B.	Portsmouth	Officer in charge Reception Hosp.	—
Morgan, C. K., M.B.	Aldershot	Instructor, Training School	10.
Morphew, E. M.	Roorkee		·
Morris, A. H.	Malta	Sanitary Officer	2.3.
Morton, H. M., M.B.	Pretoria		—
Mould, W. T.	Dover	Company Officer	—
Nicholls, H.M., M.B.	Deolali	Officer in charge Military Hospital, Specialist in Ophthalmology	—
Nickerson, W. H. S., V.C., M.B.	Cherat		2.3.
Norman, H. H.	Shwebo		-
Norrington, H. L. W.	Malta		8.
O'Flaherty, A. R.	Devonport	Company Officer	-
O'Gorman, C. J., D.S.O.	Peshawar		—
O'Grady, S. de C., M.B.	Khartoum	Officer in charge Military Hospital	1.
O'Reilly, H. W. H., M.B.	Colchester	Offi. in Med.ch. Detention Barracks	—

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8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
O'Reilly, P. S.	Wellington	Spec. in Ophthalmology	7.
Ormsby, G. J. A., M.D.	Dinapore	Officer in charge Military Hospital	—
Packer, H. D.	Devonport		3.
Palmer, F. J.	Meerut	Specialist in Advanced Oper. Surg.	5.
Palmer, H. K.	Colaba		—
Parker, L. E. L.	Poona	Sanitary Officer 6th Division	2.3.
Pearse, A.	Chatham	Company Officer	2.9.
Penny, F. S., M.B.	Hong Kong	Sanitary Officer	1.2.
Perry, S. J. C. P., F.R.C.S.I.	Belgaum		10.
Pilcher, E. M., D.S.O., M.B., F.R.C.S.	R.A.M. College	Professor of Military Surgery	5.
Pocock, H. I.	Nowshera	Officer in charge Military Hospital	16.
Poe, J., M.B.	Bloemfontein,	Offi. in charge Mil. Families' Hosp. Tempe.	—
Pollock, C. E.	War Office	Deputy Assist. Director General Army Medical Service	4.10.
Porter, F. J. W., D.S.O.	Cosham		—
Powell, E. E.	Bordon	Offi. in Med. ch. Troops and Reception Station, Longmoor	—
Prescott, J. J. W., D.S.O.	Newcastle	Adjutant School of Instruction, R.A.M.C. T.F.	7.
Probyn, P. J., D.S.O., M.B.	Londonderry	Officer in charge Military Hospital	2.
Profeit, C. W., M.B.	London	Spec. in Otology Military Hosp., Rochester Row	14.
Prynne, H. V.	Woolwich	Royal Military Academy	7.
Rattray, M. MacG., M.B	Brighton	Officer in charge Military Hospital	—
Rawnsley, G. T.	Manchester	Staff Offi. to A.M.O. East Lanc. Division T.F.	—
Read, H. W. K.	Pontefract	Officer in charge Military Hospital	—
Reilly, C. W.	Dum Dum	Officer in charge Military Hospital and Civil Surgeon, also in medical charge Ammunition Factory, Cossipore and Dunkinsore Factories and Cantonment outdoor dispensary.	2.
Richards, F. G.	Jamaica	Officer in charge Military Hospital, Newcastle	—
Riddick, G. B.	Maymyo		—
Robinson, O. L.	Poona		2.
Roch, H. S.	Leeds	Adjutant School of Instruction, R.A.M.C. T.F.	3.
Ross, N. H., M.B.	Aldershot	Company Officer, Nos. 1 & 3 Coys.	3.
Rutherford, N. J. C., M.B.	Wynberg		—
Safford, A. H.	Fyzabad		2.3.
Samman, C. T.	Mhow	Specialist in Mental Science	2.11.
Scott, A. L.	Aldershot		3.
Seeds, A. A., M.D.	Hounslow		—
Sewell, E. P., M.B.	Belfast		1.2.
Shanahan, D. D.	Ootacamund	Staff Offi. Div. M.M. Stores 9th Div.	—
Silver, J. P., M.B.	Edinburgh	Company Officer	—
Simson, H.	Poona		1.
Slaytor, E. W., M.B.	Bellary		—
Sloan, J. M., D.S.O., M B.	Aberdeen	Adjutant School of Instruction, R.A.M.C. T.F.	1.
Smith, F., D.S.O.	Murree	Divisional Sanitary Offi., 2nd Div.	2.
Smith, L. F., M.B.	Nowshera	Spec. in prevention of diseases and in charge of Brigade Laboratory	2.15.

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7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Smithson, A. E., M.B.,	Maritzburg	Officer in charge Military Hospital	2.9.
Spencer, C. G., M.B., F.R.C.S.	York	Specialist in Advanced Operative Surgery	5.
Staddon, H. E.	Shorncliffe	.. ..	—
Stallard, H. G. F.	Simla	.. ..	—
Stammers, G. E. F.	Quetta	Sanitary Officer 4th Division	1.2.
Stanistreet, G. B., M B.	London	Company Officer	—
Statham, J. C. B.	London	Clin. Pathologist Q.A. Mty. Hosp.	2.3.9.
Steel, E. B., M.B.	Neemuch	.. ..	11
Stone, C. A., M.D	Parkhurst	Officer in charge Military Hospital	—
Swabey, M.	Wellington	.. ..	12.
Sweetnam, S. W...	Kirkee	.. ..	—
Symons, F. A., M.B.	Ceylon	.. ..	—
Tate, G. W., M.B.	Dublin	Recruiting Medical Officer	2.9.
Taylor, H. S.	Straits Settlements	Officer in charge Military Hospital Tanglin	
Taylor, W. J., M.B.	West Africa	.. ..	2.10.
Thom, G. St. C., M.B.	Sabathu	.. ..	13.14.
Thompson, A. G., M.B.	Ferozepore	Officer in charge Brigade Laboratory	2.
Thomson, J., M.B.	Harrismith	Officer in charge Military Hospital	-
Thorp. A. E.	Pretoria	.. ..	..
Thurston, H. S.	Malta	Officer in charge Military Hospital, Vallotta	—
Tibbits, W., M.B.	Chatham	Offi. in charge Casualty Hospital	—
Tyacke, N.	Devonport	.. ..	—
Walton, H. B. G.	Mussoorie	Spec. in Advanced Oper. Surgery	2.3
Wanhill, C. F.	R.A.M. College	Assistant Professor of Hygiene	2.3.
Ward, W. A	Bulford	Specialist in Dermatology	4.
Waring, A. H.	Gosport	Officer in charge Mil. Hospital	10.
Watts, B.	Meerut	.. ..	2.8.
Way, L.	Cosham	.. ..	—
Webb, A. L. A.	West Africa	(On voyage out)	1.2.9.
Weld, A. E.	Malta	Officer in charge Military Families' Hospital, Vallotta	8.
Whitestone, C. W. H., M.B.	Peshawar	Staff Officer for Medical Mobilisation Store. 1st Division	—
Williams, E. M.	Calcutta	In medical charge Garrison Dispensary Fort William, and Staff-Surgeon. Spec. in Midwifery and Diseases of Women and Children	8.
Williams, E. McK.	Sheffield	.. ..	—
Winkfield, W. B.	Chakrata	.. ..	-
Winslow, L. F. F.	Sheffield	Officer in charge Mil. Hospital	—
Winter, H. E.	Gravesend	.. ..	—
Withers, S. H., M.B.	Gharial	Officer in charge Military Hospital	—
Wood, L.	Manchester	Adjutant School of Instruction, R.A.M.C. T.F.	—
Woodside, W. A.	Ipswich	Adjutant School of Instruction, R.A.M.C. T.F.	—
Wroughton, A. O. B.	Eastern Command	.. ..	4.
Young, A. H. O.	Halifax	Officer in charge Mil. Hospital	—
Young, C. A.	Shrewsbury	Staff Officer to A.M.O., Welsh Division T.F.	—

Special Qualifications.

1. State Medicine.
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6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

CAPTAINS.

Name.	Station.	Appointment.	Special Qualifications.
Adderley, A. C.	Harrismith		—
Adye-Curran, S. M.	Sialkot	Specialist in Prevention of Disease	2.
Adye-Curran, W. J. P.	Cosham	,, Advanced Opera. Surg.	5.
Ahern, D.	Alexandria		—
Ahern, M. D.	Chatham		—
Ainsworth, R. B.	Tidworth	Sanitary Offi. Tidworth District	2.3.
Amy, A. C., M.B.	Meerut	Spec. in Electric. Science 7th. Div.	—
Anderson, J. A., M.B.	Bloemfontein	Company Officer	9.
Anderson, R. G.	Egypt	Egyptian Army	—
Andrews, L. A. A.	Mauritius		—
Anthonisz, E. G.	Cannanore		—
Archibald, R. G., M.B.	Egypt	Egyptian Army	—
Argles, R. L.	Ferozepore	Staff Surgeon and in medical charge Ordnance Dept.	—
Arthur, A. S., M.B.	Inverness	Officer in charge Military Hospital	—
Aylen, E. V.	Nowshera	Specialist in Dermatology, 1st Division	4.
Bagshawe, H. V.	Lichfield		1.
Baillie, G., M.B.	London		—
Baker, W. L.	Malta	Specialist in Ophthalmology	7.
Balck, C. A. J. A., M.B	Curragh	Specialist in Physical Training	2.6.
Barbour, J. H., M.B.	Jubbulpore	In medical charge Gun Carriage Factory	—
Bartlett, B. S.	Multan		—
Bateman, H. R.	Shorncliffe		3.
Beaduell, H. O. M.		(Sick Leave)	—
Beaman, W. K.	Malta		—
Beatty, M. C., M.B.	Tregantle	Officer in charge Mil. Hospital	2.
Bell, J. G., M.B.	Seaforth	,, ,, ,, ,,	2.13.
Bell, W. J. E., M.B.	Hong Kong		—
Benett, A. M.	Jubbulpore	Staff Surgeon	—
Bennett, E.	Derby	Adjutant School of Instruction, R.A.M.C. T.F.	—
Bennett, J. A., M.B.	Mhow		—
Bennett, W., M.B.	Calcutta	In charge Bde. Laboratory	1.
Bennett, W. L., M.B. F.R.C.S.Edin.	Bermuda	Company Officer	—
Benson, W., M.B.	Rawal Pindi	Officer in charge Cant. Genl. Hosp.	—
Biggam, T., M.B.	Aldershot	Offi. in Med. ch. Troops and Reception Station, Bordon	—
Black, R. B., M.B.	Egypt	Egyptian Army	—
Blackwell, T. S.	Bhamo	Officer in charge Military Hospital	—
Blake, H. H., M.B.	Peshawar		—
Bond, A. H.	Naini Tal		—
Booth, E. B., M.D.	Kildare	Officer in charge N.D. Hospital	—
Bostock, J. S., M.B.	India	(On voyage out)	—
Bousfield, L., M.D.	Crownhill		—
Bowle, C. W.	Multan		—
Bowle, S. C.	Winchester		16.
Boyce, W. W.	Lahore		—
Boyd, J. E. M.	Ferozepore		—
Bracken, G. P. A.	Secunderabad		—
Bradish, F. L.	Jullundur		—
Bradley, F. H., M.B.	Calcutta	Officer in charge Departmental Followers Hospital, Hastings	—
Bramhall, C.	Woolwich		—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Bransbury, H. A.	Woolwich	Specialist in Dermatology	4.
Bridges, R. H.	Netley		—
Brown, G. H. J., M.B.	Rhayader Camp	Officer in Medical charge Troops	—
Brown, R. T., M.D.	Maymyo	Divisional Sanitary Officer	2.3.
Browne, C. G.	Lucknow	Specialist in Dermatology, 8th Division	—
Browne, T. W.	Kamptee		—
Browne, W. W.	Colchester	Specialist in Physical Training	2.6.
Brunskill, J. H., M.B.	Curragh	Clinical Pathologist	3.
Bryden, R. A.	Bloemfontein		—
Buchanan, R. J. B.	Cosham	Clinical Pathologist	2.3.
Burke, B. B.		(West African Leave)	13.
Burney, W. H. S.	Birr		—
Byam, W.	Egypt	Egyptian Army	—
Byatt, H. V. B.	Poona		—
Caddell, E. D., M.B.	Ambala		—
Cahill, R. J., M.B.	Curragh		—
Campbell, J. H., M.B.	Warrington		2.
Carlyon, A. F.	Devonport		—
Carmichael, D. G., M.B.	R.A.M. College		—
Carmichael, J. C. G., M.B.	Manchester	Officer in charge Military Hospital	—
Carr, C. H., M.D.	Tidworth	Specialist in Dental Surgery	16.
Carruthers, V. T., M.B., F.R.C.S.Edin.	Ceylon	Officer in charge Military Hospital, Kandy	—
Carson, H. W., M.B.	Peshawar		—
Carter, H. St. M., M.D.	Aldershot		—
Casement, F., M.B.	Lucknow		—
Cassidy, C., M.B.	Egypt	Egyptian Army	—
Cathcart, G. E.	Trawsfynydd Camp	Officer in Medical charge Troops	—
Chapman, F. H. M.	Calcutta		—
Churchill, G. B. F.	Meiktila	Officer in charge Military Hospital	—
Churton, J. G.	Peshawar	Specialist in Advanced Operative Surgery, 1st Division and Staff Surgeon	5.
Clarke, F. A. H.	Fort George	Officer in charge Military Hospital	1.
Clarke, J. B., M.B.	Colchester	Spec. in Advanced Oper. Surgery	5.
Coates, T. S., M.B.	Woolwich	Medical Officer, Royal Arsenal	—
Collins, R. T.	Woolwich		—
Connell, H. B.	Irish Command		—
Conway, J. M. H., F.R.C.S.I.	Dublin		—
Conyngham, C. A. T., M.B.	Quetta		—
Cooke, O. C. P.	Deolali	Offi. in charge Cantonment Hosp.	—
Coppinger, C. J., M.B.	Limerick		—
Corbett, D. M., M.B.	Dalhousie	Officer in charge Cantonment Gen. Hospital	—
Cordner, R. H. L.	Bulford		—
Cotterill, L.	Aldershot	O.C. "C" Coy. Depôt, R.A.M.C.	1.
Cotton, F. W.	Fleetwood	Officer in charge Military Hospital	—
Coutts, D., M.B.	Allahabad	Staff Surgeon	—
Cowey, R. V.	Tidworth	Offi. in ch. Mty. Families' Hosp.	8.
Craig, B. A.	Hong Kong		—
Crawford, J. M. M. F.R.C.S.I.	Colchester		—
Croly, W. C.	Secunderabad		—
Cromie, M. J.	Delhi		—
Crossley, H. J.	Richmond, York	Officer in charge Military Hospital	—
Crosthwait, W. S.	Fermoy		—

Special Qualifications.

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9. Diploma in Tropical Medicine.
10. Skiagraphy
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Cummins, A. G., M.B.	Egypt	Egyptian Army	—
Cuthbert, J. M., M.B.	Edinburgh	Clin. Path. and Recruiting duties	3.
Dalgliesh, F. B.	Mhow		—
Davidson, H. A., M.B.	Curragh	Company Officer	2.
Davidson, P., D.S.O., M.B.	Aldershot	O.C. "A" Coy. Depôt R.A.M.C.	6
Davis, A. H. T.	Secunderabad		—
Davis, W.	Bareilly	Staff-Surgeon	—
Davy, P. C. T., M.B.	Jutogh		—
Dawson, A., M.B.	Wellington	Officer in charge Enteric Convalescent Depôt, Spec. in Prevention of Disease	2.
Dawson, F. W. W., M.B.	Dublin		-
Dawson, G. F., M.B.	Meerut	Specialist in Dermatology	—
De la Cour, G., M.B.	Bangalore	Spec. in Advanced Oper. Surgery	-
Dennis, B. R., M.B.	Straits Settlements	Clinical Pathologist and Sanitary Officer	3.
Denyer, C. H.	Jubbulpore	Specialist in Dermatology	—
Dickenson, R. F. O'T.	Jhansi	In charge Brigade Laboratory	2.
Dickson, H. S.	Gibraltar	,, Pathological Laboratory and Anæsthetist	-
Dickson, R. M., M.B.	Lucknow		—
Dill, M. G., M.D.	Ayr	Officer in charge Military Hospital	—
Doig, K. A. C.	Hilsea		-
Dorgan, J., M.B.	Cork	Sanitary Officer Cork District	1.2.9.
Douglass, J. H., M.D.	Dublin		2.
Douglass, P. C.	Weedon	Officer in charge Military Hospital	—
Dowling, F. T., M.B.	Khanspur	,, ,, ,, ,,	—
Drew, C. M., M.B.	Egypt	Egyptian Army	—
Dudding, T. S.	Colchester		—
Duffey, A. C., M.D.	Rawal Pindi	Staff-Surgeon "A," and in charge Military Families' Hospital	8.
Duguid, J. H., M.B.	Tipperary	Officer in charge Military Hospital	13.
Dunbar, B. H. V., M.D.	Belfast		--
Dunkerton, N. E.	Woolwich		-
Dunn, W. J., M.B.	Colaba		
Dunne, J. S., F.R.C.S.I.	Agra		-
Dwyer, P., M.B.	Aldershot		2.
Easton, P. G.	Aldershot	Spec. in Midwifery. In Med. ch. Families, Marlborough Lines	8.
Edmunds, C. T.	Cherat	Offi. in charge Cantonment Hosp	-
Edwards, G. B	Mauritius	Officer in charge N.D. Hospital, Vacoas	--
Egan, W., M.B.	Rangoon		-
Ellcome, J. E.	Kamptee		-
Ellery, R. F.	Benares	Officer in charge Military Hospital	--
Elliott, E. J., M.B.	Newcastle		—
Elliott, A. C., M.B.	Campbellpore	Officer in charge Military and Cantonment Hospital	--
Ellis, W. F.	Bradford	Officer in charge Military Hospital	—
Emerson, H. H. A., M.B.	Clonmel		3.
Eves, T. S., M.B.	Agra		-
Fairbairn, J., M.B.	West Africa	Officer in charge Military Hospital, Port Lokkoh	—
Falkner, M.W., F.R.C.S.I.	Curragh	Specialist in Advanced Operative Surgery	5.
Farebrother, H. W.	Bangalore		-
Farrant, P.	Sling Plantation, Tidworth	Officer in Medical charge Troops	—
Fawcett, C. E. W. S., M.B.	Thayetmyo	Offi. in charge Military Hospital	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Fawcett, H. H. J.	Netley		6.
Fawcett, R. F. M.	Gosport		—
Ferguson, G. E.	Cyprus	Officer in charge Military Hospital	—
Ffrench, E. G., M.D., F.R.C.S.Edin.	Ahmednagar		—
Field, S.	Jamaica		—
Fielding, T. E., M.B.	Woolwich	Adjutant School of Instruction, R.A.M.C. T.F.	3.
Fitzgerald, FitzG. G.	Dover	Medical Officer, Duke of York's Royal Military School	—
Fleming, C. E., M.B.	Colchester	Anæsthetist	7.
Forrest, F.	Bangalore		—
Forsyth, W. H., M.B.	Pretoria		9.
Fortescue, A., M.B.	Cawnpore		—
Foster, A. L.	Kalabagh	Officer in charge Military Hospital	—
Foster, J. G., M.B.	Bangalore		—
Foster, J. R.	Mhow	Staff Surgeon and in charge Followers Hospital	—
Foster, R. L. V., M.B.	Devonport		1.
Foulds, M. F.	Belfast	Spec. in Adv. Operative Surgery	5.
Franklin, R. J.	Queenstown	Officer in Medical charge Troops Fort Camden	—
Fraser, A. D., M.B.	Uganda	(Seconded under Colonial Office)	—
Fraser, A. E. G.	Cairo		
Fraser, A. N., M.B.	Glasgow	Adjutant School of Instruction, R.A.M.C. T.F.	—
Frost, A. T., M.B.	Dublin	Specialist in Dermatology	4.
Fry, W. B.	Egypt	Egyptian Army	3.
Furnivall, C. H.	Secunderabad		—
Galwey, W. R., M.B.	Dalhousie		2.
Garland, F. J., M.B.	Bury	Officer in charge Military Hospital	—
Gater, A. W.	Fermoy		—
Gatt, J. E. H., M.D.	Benares		—
Gibbon, E., M.B.	Egypt	Egyptian Army	—
Gibbon, T. H., M.D.	Canterbury		—
Gibson, A. W.	Gibraltar	Specialist in Advanced Operative Surgery	5.
Gibson, H.	Jhansi		—
Gibson, H. G.	Malta		—
Gibson, L. G.	Amritsar	Officer in charge Military and Cantonment General Hospital	—
Glanvill, E. M., M.B.	York		—
Goodwin, W. R. P.	Fyzabad	Officer in charge Cantonment General Hospital	7.
Gotelee, H. E.	Holywood		2.
Graham, J. H., M.B.	Gibraltar		—
Grant, J. F., M.B.	Allahabad		—
Grant, M. F.	Aldershot		—
Gray, A. C. H., M.B.	Dublin	Clinical Pathologist	3.
Greenwood, A. R.	Aldershot	Specialist in Advanced Operative Surgery	5.
Gregg, R. G. S., M.B.	Lucknow	In charge "Weir Laboratory"	2.
Gurley, J. H.	Woolwich		—
Hallowes, R. C., M.B.	Dundalk	Officer in charge Military Hospital	—
Hamerton, A. E., D.S.O.	Nyasaland	(Spec. duty under Colonial Office)	3.
Hanafin, J. B., F.R.C.S.I.	Khyra Gali	Officer in charge Section Hospital	—
Hanafin, P. J.	Dublin	Spec. in Ophthalmology	2.7.
Harding, C. E. L., M.B.	Poona		—

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8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Harding, D. L., F.R.C.S.I.	Athlone		—
Harding, H., M.B.	York		—
Harding, N. E. J., M.B.	W. Africa		9.
Hart, H. P., M.B.	Rangoon		—
Hart, J. C., M.B.	Peking	Officer in charge Military Hospital	—
Harty, T. E.	Guildford	,, ,, ,, ,,	—
Harvey, G. A. D.	Dover		—
Harvey, W. J. S.	Chatham		—
Hastings, A. E. F.	Darjeeling		—
Hayes, A. H., M.R.C.P. Lond.	York	Sanitary Offi., Northern Command	2.3.
Henderson, P. H., M.B.	Portsmouth		1.
Hendry, A., M.B.	Indore	Officer in charge Section Hospital	-
Heron, G. W.	Egypt	Public Health Department	—
Heslop, A. H., M.B.	Rawal Pindi		—
Hewson, F. M.	Karachi		—
Hildreth, H. C., F.R.C.S. Edin.	Glen Imaal	Officer in charge N.D. Hospital	—
Hingston, J. C. L.	Madras	Officer in Medical charge H.E. the Governor's Body Guard	—
Hoar, J. E.	Belfast		—
Holden, C. W.	Tientsin	Officer in charge N.D. Hospital, Shan-hai-Kuan	2.9.
Hole, R. B., M.B.	Cosham		—
Honeybourne, V. C.	Mhow		—
Houghton, G. J.	West Africa	Officer in charge Military Hospital, Tower Hill	—
Houston, J. W., M.B.	Belgaum	In charge Bde. Laboratory, Cant. Hospital, and Specialist in Prevention of Disease	—
Howell, F. D. G.	Multan		—
Howell, H. L	Ahmednagar	In charge Bde. Laboratory, Cant. Hospital, and Specialist in Prevention of Disease	—
Howley, H. E. J. A.	Cawnpore		—
Hughes, G. W. G.	York	Anæsthetist	—
Hull, A. J.	London	Clinical Assistant Q.A. Mil. Hosp.	—
Humfrey, R. E., M.B	Jhansi		—
Hunt, R. N., M.B.	Cairo		—
Hyde, D. O., M.B.	York	Staff Officer to A.M.O. W. Riding Division, Territorial Force	-
Hyde, P. G., M.B.	Dublin		—
Iovers, O., M.B.	Wynberg,	Company Officer	—
Irvine, A. E. S.	Simonstown	Officer in charge N.D. Hospital	—
Irwin, A. W. A.	Gibraltar	Embarkation Medical Officer	—
Jacob, A. H.	Rawal Pindi		—
James, J., M.B.	Potchefstroom		—
Jameson, A. D.	India	(On voyage out)	4.
Johnson, B.	St. Thomas' Mount		—
Johnson, J. T., M.D.	Ranikhet		2.
Johnson, V. G.	Nowshera	Officer in charge Cant. Hospital	—
Johnstone, D. P.	Wrexham	Officer in charge Military Hospital	2.9.
Jones, A. E. B., M.D.	Mandalay	,, ,, ,, ,,	—
Jones, J. L.	Netley		—
Kavanagh, E. J., M.B.	Ranikhet		—
Keane, G. J., M.D.	Uganda	(Seconded under Colonial Office)	2.9.
Keane, M.	Meerut		—
Kelly, C., M.B.	Secunderabad		—

Special Qualifications.

1. State Medicine.
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6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name	Station.	Appointment.	Special Qualifications.
Kelly, H. B., M.B.	Curragh	Officer in charge Military Families' Hospital	8.
Kelly, W. D. C., M.B.	Dublin	Specialist in Advanced Oper. Surg.	5.
Kempthorne, G. A.	Glencorse	Officer in charge Military Hospital	—
Kennedy, J. C., M.D.	R.A.M. College	Assistant Professor of Pathology	3.9.
Lambelle, F. W., M.B.	Mhow	Specialist in Advanced Operative Surgery	5.
Lambert, F. C.	Liverpool	Recruiting Duties	—
Langrishe, J. du P., M.B.	Poona		—
Lathbury, E. B.	Nasirabad	In charge Brigade Laboratory	—
Lauder, F. P.	Cork		—
Leahy, M. P., M.B.	Kirkee		—
Leckie, M.	Egypt	Egyptian Army	—
Lelean, P. S., F.R.C.S.	Meerut	Sanitary Officer, 7th Div.	2.5.
Leslie, R. W. D.	Malta		—
Leslie, T. C. C.	Maritzburg		—
L'Estrange, E. F. Q.	Bellary		—
Lewis, R. P.	Wynberg		—
Lewis, R. R.	Aldershot		—
Lewis, S. E., M.B.	Devonport		8.
Lithgow, E. G. R.	Sheerness		—
Littlejohns, A. S.	Pretoria		—
Lloyd, J. R.	Jubbulpore		—
Lloyd-Jones, P. A., M.B.	Kinsale		—
Lochrin, M. J.	Bangalore		—
Long, H. W., M.B.	W. Africa		
Loughnan, W. F. M.	Bareilly	Spec. in Prevention of Disease	2.
Low, N.	Belfast	Company Officer	—
Lucas, T. C., M.B.	Bombay	Surg. to H.E. the Governor of Bombay.	2.
Lunn, W. E. C., M.B.	Lahore	Staff-Surgeon	—
Luxmoore, E. J. H.	Dover		—
Lynch, J. P.	Shorncliffe		—
McCammon, F. A., M.B.	Quetta		—
McCarthy, D. T., M.B.	Lucknow		—
McCombe, J. S., M.B.	Malappuram	Officer in charge Military Hospital	—
McConaghy, W., M.B.	Tidworth		—
MacDowell, W. MacD.	Aldershot		—
McEntire, J. T., M.B.	West Africa	Sanitary Officer	—
McEwen, O. R.	Dalhousie		—
McGrigor, D.B., M.B.	Karachi		—
Mackenzie, D. F., M.B.	Dinapore		9.
McKenzie, J., M.B.	Pirbright	Officer in Medical charge Troops	2.
McLennan, F., M.B.	Aberdeen	Officer in charge Military Hospital	—
McMunn, A.	Dublin		—
MacNicol, R. H., M.B.	Colchester		4.
McQueen, C.	Pretoria		—
Marett, P. J.	Malta	Officer in Med. ch. Troops, Gozo	—
Maughan, J. St. A.	Parkhouse Camp	Officer in Medical charge Troops	—
Maydon, W. G., M.B.	Glasgow		—
Meaden, A. A.	Kilworth Camp	Officer in charge N.D. Hospital	—
Meadows, S. M. W.	Oxford		8.
Meldon, J. B., M.B.	Shorncliffe		—
Meredith, R. G., M.B.	Sheffield		—
Middleton, E. M.	Rawal Pindi		—
Millar, C. R.	W. Africa	Officer in charge Military Hospital, Wonkufu	—
Mitchell, A. H. McN.	Netley	Specialist in Ophthalmology	7.

Special Qualifications.

1. State Medicine.
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6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Mitchell, W., M.B.	Sabathu	Officer in ch. Cant. Genl. Hosp.	—
Moore, E. H. M.	Newport	Officer in charge Military Hospital	—
Moriarty, T. B.	Lucknow	Officer in charge X-rays Apparatus, Specialist in Electrical Science, 8th Division	—
Morris, C. R. M., M.B.	Sialkot		—
Moss, E. L.	Dublin		—
Mulligan, J. B. G.	Malta		—
Murphy, J. P. J., M.B.	Dover		2.
Murphy, L.	Secunderabad		—
Myles, C. D., M.B.	Gosport		2.
Newman, R. E. U., M.B.	Murree	Officer in charge Cant. Genl. Hosp.	—
Nimmo, W. C.	Chakrata	,, ,, Cant. Hospital	—
O'Brien, C. W.	Kilbride	Officer in charge N.D. Hospital	—
O'Brien-Butler, C. P.	Poona		—
O'Carroll, A. D., M.B.	Aden	Officer in charge Section Hospital	—
O'Connor, R. D.	Cliffden	,, ,, Military Families' Hospital	—
Odlum, B. A.	Wynberg		—
O'Farrell, W. R.	Khartoum		-
O'Grady, D. De C.	Barian	Officer in charge Military Hospital and Specialist in Dermatology, 2nd Div.	—
O'Keeffe, J. J., M.B.	Roorkee	Officer in charge Military Hospital	—
O'Kelly, R.	Ranikhet		—
Ommanney, F. M. M.	Colchester	Company Officer	—
O'Neill, E. M., M.B.	Nowgong		
Ormrod, G., M.B.	Belfast		–
Osburn, A. C.	Colchester		—
Otway, A. L., M.B.	Belfast	Officer in ch. Finner Camp Hosp.	—
Paine, E. W. M.	Calicut		-
Painton, G. R.	West Africa		-
Pallant, S. L.	Netley		13.16.
Parkes, E. E., M.B.	Plymouth	Specialist in Ophthalmology	7.
Parry, F. M., M.B.	Maidstone	Adjutant School of Instruction R.A.M.C. T.F.	2.
Parsons, A. R. C.	Edinburgh	Specialist in Advanced Oper. Surg.	5.
Pascoe, J. S.	Enniskillen	Officer in charge Military Hospital	—
Patch, B. G.	York		13.
Pennefather, E. M.	Buttevant	Officer in charge Military Hospital	—
Porry, H. M. J.	Hong Kong		—
Petit, G.	Meerut	Staff Surgeon	—
Phelan, E. C., M.B.	Lebong		—
Phillips, T. McC., M.B.	Fyzabad		—
Pinches, H. G.	Straits Settlements	Officer in charge Military Hospital, Blakan Mati	—
Popham, R. L.	Cork		-
Potter, T. J.	London	Recruiting Duties	2.3.
Potts, E. T., M.D.	Pretoria	Officer in charge Military Families' Hospital	—
Powell, E. W.	Aden		3.
Powell, J., M.B.	Egypt	Egyptian Army	—
Powell, J. E.	Rhayader Camp		—
Power, P., M.B.	Kilkenny	Officer in charge Military Hospital	4.
Power, W. M.	Jamaica	,, ,, ,, ,, Port Royal	8.
Priestley, H. E.	Gibraltar		—
Purdon, W. B., M.B.	Wellington		—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Purser, L. M., M.B.	Sialkot	Specialist in Otology, Laryngology and Rhinology	13.14.
Rahilly, J. M. B., M.B.	Woolwich		—
Ranking, R. M., M.B.	Cork	Specialist in Advanced Oper. Surg.	5.
Reed, G. A. K. H.	Aldershot	Specialist in Physical Training	6.
Rees, G. H., M.B.	Alexandria		—
Renshaw, J. A.	Bangalore		—
Riach, W., M.D.	London	Clinical Assistant Q.A. Mil. Hosp. and Spec. in Ophthalmology	2.7.
Richard, G. H.	Londonderry		—
Richmond, J. D., M.B.	Piershill and Leith Fort	Officer in Med. charge of Troops	—
Rigby, C. M.	Jubbulpore		—
Ritchie, M. B. H., M.B.	Murree	Offg. S.O., M.M.S., 2nd (Rawal Pindi) Division	—
Ritchie, T. F., M.B.	W. Africa	Officer in charge Military Hospital, Mabanta	—
Roberts, F. E.	Edinburgh		—
Robinson, J. H.	Curragh		8.
Robinson, T. T. H., M.B	Neemuch	Officer in charge Followers Hosp.	—
Rogers, H., M.B.	Queenstown	Offi. in Med. ch. Ft Westmoreland	—
Ronayne, C. R. L., M.B.	Gibraltar	Specialist in Ophthalmology. Company Officer	7.
Rose, A. M., M.B.	Aldershot		2.
Rowan-Robinson, F. E., M.B.	Norwich		—
Rudkin, G. F.	Madras		—
Rugg, G. F.	Quetta		5.
Russell, H. W., M.D.	Aldershot	Clinical Pathologist Camb. Hosp.	3.
Rutherford, R., M.B.	Straits Settlements		-
Ryan, E.	Aldershot	Specialist in Midwifery. In Med. ch. Families, Stanhope Lines	8.
Ryley, C.	Shoeburyness		2.
Sampey, A. W.	Warley		2.9.
Sampson, F. C., M.B.	Potchefstroom		—
Sampson, P.	Upper Topa	Officer in charge Military Hospital	—
Scaife, C., M.D.	Colaba	Specialist in Prevention of Disease	2.
Scatchard, T.	Ranikhet	Staff Surgeon and in charge Cantonment Hospital	—
Scott, J. W. L.	Quetta		—
Scott, T. H., M.B.	Jullundur	Officer in Civil Medical charge Cantonment	—
Seccombe, J. W. S.	Nasirabad	Officer in ch. Cantonment Hosp.	2.
Sexton, T. W. O.	Pretoria		—
Shea, H. F., M.B.	Lucknow	Spec. in Advanced Oper. Surgery	—
Sheehan, G. F.	Barrackpore	Specialist in Mental Science	11.
Shepherd, A., M.B.	Landour		—
Sherren, H. G.	Colaba		—
Siberry, E. W.	Pretoria	Company Officer	—
Sidgwick, H. C., M.B.	Jamaica		—
Sim, J. A. B., M.B.	Bermuda		—
Sinclair, M., M.B.	Tralee	Officer in charge Military Hospital	—
Skelton, D. S.	Strensall	,, ,, ,, ,,	2.3.
Skinner, R. McK.	Straits Settlements	Officer in charge Military Hospital, Fort Canning	8.
Smales, W. C.	Poona	Officer in charge Cantonment Hosp., Spec. in Electrical Science	—
Smallman, A. B., M.B.	Woolwich		2.
Smith, C. S., M.B.	Mullingar	Officer in charge Military Hospital	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
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8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Smith, S. B., M.D.	Belfast	Sanitary Officer Belfast District	2.
Smyth, R. S., M.D.	Ambala		—
Sparkes, W. M. B.	Dublin		13.14.
Spencer, J. H., M.B.	Kasauli		—
Spiller, W. M. H., M.B.	Liverpool	Adjutant School of Instruction, R.A.M.C. T.F.	2.3.
Spong, W. A., M.B.	Quetta		—
Stack, H. T., M.B.	Londonderry		—
Stanley, C. V. B., M.D.	Egypt	Public Health Department	—
Steele, W. L.	Tidworth	Spec. in Advanced Opera. Surgery	5.
Stephens, F. A.	Birmingham	Adjutant School of Instruction, R.A.M.C. T.F.	—
Stevenson, A. L., M.B.	Nowshera		—
Stevenson, G. H., M.B.	Ambala		—
Stewart, H., M.B.	Solon	Officer in charge Military and Cantonment General Hospital	—
Stewart, P. S., M.B.	Malta		—
Storrs, R.	Portsmouth	Officer in charge Mil. Fam. Hosp.	8.
Straton, C. H.	London	Sanitary Officer Eastern Command and London District	1.2.
Stuart, F. J., M.B.	Fyzabad	Officer in charge Brig. Laboratory	—
Suhr, A. C. H., M.B.	Malta		2.
Sutcliff, A. A., M.B.	Alderney	Officer in charge Military Hospital	—
Sylvester-Bradley, C. R.	Cosham		6.
Symons, V. H.	Bloemfontein		—
Tabuteau, G. G.	Jutogh	Officer in charge Military Hospital	—
Tate, R. G. H., M.D.	Kasauli	In charge Brigade Laboratory and Cantonment General Hospital	2.
Thompson, R. J. C.	Egypt	Egyptian Army	—
Thompson, W. I., M.B.	Lucknow		—
Thomson, C. G.	Edinburgh		—
Thomson, C. P., M.D.	Egypt	Public Health Department	—
Thomson, D. S. B., M.B.	Egypt	Egyptian Army	—
Thorpe, L. L. G.	Netley		—
Thurston, L. V.	Fethard	Officer in charge N.D. Hospital	—
Tobin, J.	Devonport	Officer in charge Mil. Fam. Hosp.	8.
Tobin, W. J.	Secunderabad		—
Todd, R. E., M.B.	Cairo		—
Turnbull, J. A.	Edinburgh		—
Turner, C. H.	Newbridge	Officer in charge Military Hospital	—
Turner, F. J.	Aldershot		—
Turner, F. T.	Purandhar	Officer in charge Military Hospital	—
Tyndale, W. F., C.M.G., M.B.	Devonport	Sanitary Officer Devonport District	1.2.
Unwin, T. B., M.B.	West Africa	Offi. in ch. Mil. Hosp., Wilberforce	—
Varvill, B.	Quetta		—
Vaughan, W. F. H.	Cosham		—
Vidal, A. C.	Bloemfontein		—
Walker, F. S., F.R.C.S.I.	Queenstown	Officer in Medical charge Troops, Haulbowline	—
Walker, N. D., M.B.	R.A.M. College	Spec. in Physical Training	2.6.
Walker, S. G., M.B.	Cawnpore	Officer in Medical charge Harness and Saddle Factory	—
Wallace, G. S., M.B.	Aldershot	Company Officer No. 2 Company	2.
Ware, G. W. W., M.B.	Aden		—
Waring, A. D., M.B.	Hong Kong	Company Officer	—
Waters, W. J.	N. China	(On voyage out)	—
Watson, D. P., M.B.	Preston		—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name	Station.	Appointment.	Special Qualifications.
Webster, J. A. W.	Fermoy		—
Wells, A. G.	Multan		—
West, J. W., M.B.	Murree	Spec. in Advanced Oper. Surgery and Staff Surgeon, N. Army	2.5.
Weston, A. F.	Netley	Clinical Pathologist	3.
Weston, W. J.	Gibraltar		3.
Wetherell, M. C., M.D.	Curragh		-
Whelan, J. F., M.B.	Nowgong	Officer in charge Military Hospital	2.
White, C. F., M.B.	Jhansi		—
White, R. K.	Fermoy		—
Whitehead, E. C., M.B.	Edinburgh		—
Wiley, W., M.B.	Dover		—
Williams, A. S.	Dinapore		—
Williamson, A. J., M.B.	Woolwich	Spec. in Advanced Oper. Surgery	5.
Wilmot, R. C.	Colchester	Spec. in Ophthalmology	7.
Wilson, H. T.	Wool Camp	Officer in Medical charge Troops	—
Wilson, M. O., M.B.	Gharial		—
Wilson, R. C., M.B.	Netley	Officer in charge Mil. Fam. Hosp. and Specialist in Otology	13.14.
Winckworth, H. C.	Aldershot		5, 16.
Winder, J. H. R., M.D.	Aldershot	In Medical charge Families, Wellington Lines	—
Winder, M. G.	Dover		—
Wingate, B. F.	Secunderabad		
Wood, A. E. B., M.B.	Woolwich		-
Wood, J. L.	Naini Tal	Officer in ch. Enteric Convalescent Depôt, Spec. in Prev. of Disease	—
Woodley, R. N.	Bulford	Officer in charge Mil. Fam. Hosp	—
Worthington, F., M.B.	Ceylon		-
Worthington, E.S., M.V.O.	London	Clin. Asst. Q. A. Military Hosp.	5.
Wright, T. J.	Aldershot		2.
Wyatt, C. J., M.B.	Chatham		—

LIEUTENANTS.

Name	Station.	Appointment.	Special Qualifications.
Allnutt, E. B.		(On probation)	—
Archer, T. C. R.	Woolwich		—
Beckton, J. J. H.	Sialkot		—
Benson, C. T. V.	Aldershot		—
Bevis, A. W.	Chatham		—
Biggar, B., M.B.		(On probation)	—
Bissett, W., M.B.	Woolwich		-
Blackmore, H. S.		(On probation)	—
Bowie, J. D., M.B.	Aldershot		—
Brett, P. M. J., M.B.	Netley		—
Bridges, R. F., M.B.	Shorncliffe		—
Bruce, D. W., M B.		(On probation)	—
Buckley, L., M.B.		(,, ,,)	—
Buist, D. S., M.B.	Quetta		—
Byrne, A. W., M.B.	Dalhousie		—
Calthrop, E. S., M.B.		(On probation)	—
Cane, A. S.	London	Officer in Medical charge Troops, St. John's Wood	—
Cane, E. G. S.	Curragh		-
Chambers, G. O.	York		
Clark, J. A., M.B.	Cairo		—
Clarke, C., M.B , F.R.C.S.	Malta		—
Collett, G. G., M.B.	Quetta		—

Special Qualifications.

1. State Medicine
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4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynaecology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Comyn, K.	Woolwich	..	—
Cowen, E. G. H., M.B.	..	(On probation)	—
Cunningham, F.W.M., M.D.	Curragh	..	—
Davidson, R., M.B.	..	(On probation)	—
Davies, R. M., M.B.	Chatham	..	—
Deane, E. C.	..	(On probation)	—
Dickson, T. H., M.B.	Galway	Officer in charge Military Hospital	—
Dive, G. H., M.R.C.P.	London	Clinical Assistant Q.A. Mil. Hosp.	2.
Drummond, M.	..	(On probation)	—
Dykes, S. S., M.B.	Barry and Buddon Camp	Officer in Medical charge Troops	—
Edwards, H. R.	Woolwich	..	—
Elliott, J. M., M.B.	..	(On probation)	—
Elvery, P. G. M.	Cairo	Officer in charge Mil. Fam. Hosp.	—
Field, P. C.	Aldershot	Officer in charge Detention Hosp.. Deepcut and Blackdown	—
Finny, C. M., M.B.	Curragh	..	—
Franklin, C. L., M.B.	Preston	..	—
Fretz, W. L. E., M.B.	Aldershot	..	—
Frost, W. A., M.B.	Aldershot	..	—
Fyffe, E. L., M.B.	Queenstown	Offi. in Med. ch. Troops, Fort Carlisle	
Gale, R., M.B.	London	..	—
Gall, H.	Dagshai	..	—
Gaunt, E. T., M.B.	Canterbury	..	—
Gaunt, J. K., M.B.	Lisnagar Camp	Officer in Medical charge Troops	—
Gilmour, J., M.B., F.R.C.S.Edin.	Devonport	..	—
Graham, W. T., M.B.	Tidworth	..	—
Hallinan, T. J., M.B.	Youghal	Officer in charge N.D. Hospital	—
Harold, C. H. H., M.D.	London	..	—
Hayes, L. C., M.B.	R A M. College	..	—
Hayes, P., M.B.	Aldershot	..	—
Heale, A. S.	..	(On probation)	—
Hill, J. R., M.B.	Lancaster	Officer in charge Military Hospital	—
Hudleston, I. R.	..	(On probation)	—
Hutchinson, V. P.	Netley	..	—
Jones, A. G., M.B.	Tidworth	..	—
Jones, J. B., M.B.	Muttra	Officer in charge Military Hospital	—
Joynt, H. F., M.B.	Hounslow	..	—
Kidd, J. D., M.B.	Curragh	..	—
Kinkead, R. C. G. M., M.B.	Ballincollig	Officer in charge Military Hospital	—
Kyle, S. W., M.B.	Jubbulpore	..	—
Laing, F. R., M.B.	Bordon	..	—
Laird, W. B.	..	(On probation)	—
Lambkin, E. C., M.B.	S. China	(On voyage out)	—
Lane, J. W., M.D.	Kamptee	..	—
Leeson, H. H.	Cairo	..	—
Levack, J. S., M.B.	R.A.M. College	..	—
MacArthur, D. H. C., M.B.	Dagshai	Officer in charge Cantonment General Hospital	—
MacArthur, W. P., M.D.	Aldershot	..	2.
McCreery, A. T. J., M.B.	Mhow	..	—
MacIlwaine, A. G. J.	..	(On probation)	—
McNeill, A. N. R., M.B.	Mauritius	Offi. in ch. Mty. Hosp. Port Louis	—
McSheehy, O. W., M.B.	Taunton	..	—
Manifold, J. A., M.B.	Glasgow	Recruiting duties	—
Marshall, W. E., M.B.	Egypt	Egyptian Army	—
Mathieson, W.	Potchefstroom	..	—
Mitchell, T. J., M.B.	Lahore	..	—

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7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Monteith, H. G.		(On probation)	—
Nicholls, T. B., M.B.	Cairo		—
Nicol, C. M., M.B.	Ipswich	Officer in charge Military Hospital	—
Nolan, R. H.	Barian		—
O'Connor, A. P., M.B.	Shorncliffe		—
O'Riordan, W. H	York		
O'Rorke, C. H., M.B.	Chakrata		—
Osmond, T. E.		(On probation)	—
Paris, R. C.	Netley		—
Parkinson, G. S.	Harrismith		—
Parsons-Smith, E. M.	Egypt	Egyptian Army	—
Pollard, A. M.	Bloemfontein		—
Priest, R. C., M.B.	Colchester		—
Ranken, H. S., M.B.	Egypt	Egyptian Army	—
Rennie, W. B., M.B.	Hyderabad		—
Reynolds, D., M.B.	Cork		—
Robb, C., M.B.	Curragh		—
Robertson, H. G., M.B.	Lichfield		—
Robinson, F. A., M.B.	Curragh		—
Roche, J. J. D., M.B.	Gibraltar		—
Ryles, C., M.B.	Karachi	In charge Brigade Laboratory and Spec. in Prevention of Disease	—
Saunders, S. McK.	Egypt	Egyptian Army	—
Seaver, C. D. K.	Cork		—
Sherlock, C. G., M.D.	Lahore		—
Simson, J. T., M.B.	Aldershot		—
Skrimshire, F. R. B.		(On probation)	—
Somers-Gardner, F. H., M.B.	Gibraltar		—
Spence, B. H. H., M.B.		(On probation)	
Stack, G. H., M.B.	London		—
Stallybrass, T. W., M.B.	Netley		—
Stanley, H. V., M.B.	Dublin		—
Startin, J.	Kirkee		—
Steven, W. S. R., M.B.	Woolwich		—
Stewart, W., M.B.		(On probation)	
Stirling, A. D., M.B.	Egypt		2.
Stoney, E. C., M.B.	Colchester		—
Stringer, C. H.	Netley		—
Sykes, S. P., M.B.		(On probation)	—
Tamplin, F. S.		(,, ,,)	—
Taylor, G. P., M.B.	Irvine Camp	Officer in Medical charge Troops	—
Todd, H. C., M.B.		(On probation)	—
Tomlinson, P. S.	Tidworth		—
Treves, W. W., M.B. F.R.C.S.	Chatham		—
Vaughan, E. V., M.B.	Straits Settlements		—
Vivian, R T.		(On probation)	—
Way, L. F. K.	Cosham		—
Webster, W. L., M.B.		(On probation)	—
Weddell, J. M.	London		—
Wells, H. J. G., M.B.		(On probation)	—
Weston, T. A., M.B.		(,, ,,)	—
White, M., M.B.	Bordon		—
Wigmore, A. J. O.		(On probation)	—
Williamson, M. J., M.B.	Hamilton Camp	Officer in Medical charge Troops	
Wilson, G., M.B.	Aldershot		—
Winder, A. S. M., M.B.	India	(On voyage out)	—

Special Qualifications.

1. State Medicine.
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6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment	Special Qualifications.
Wright, A. R., M.B.	Malta		—
Wright, W. G., M.B.	Gibraltar		—
Yourell, J. R., M.B.	India	(On voyage out)	—

QUARTERMASTERS.

HONORARY MAJORS

Name.	Station.
Beach, J. H. W.	Devonport.
Brake, T. F.	Curragh.
Bruce, A.	Woolwich.
Hasell, H. G.	Malta.
Short, J. B.	London.

HONORARY CAPTAINS

Archibald, W N	Colchester.
Attwood, J.	Tientsin.
Audus, H. J. F.	Tidworth.
Chalk, A. J.	Egypt.
Clapshaw, A.	Bloemfontein.
Conolly, J. B.	Wynberg
Cowan, R R.	Aldershot.
Crookes, F.	Woolwich.
Essex, B. E.	Egypt.
Exton, T	Tidworth.
Glover, H W.	Chester.
Green, J.	Malta.
Hall, F. W.	Cape Town.
Houghton, E.	Pretoria.
Lunney, A.	Cosham.
McClay, J.	York.
Offord, E. P.	Gibraltar.
Scott, R.	Dublin
Short, G. F.	Belfast.
Spackman, H.	Chatham.
Talbot, W. J C.	Woolwich.
Wakefield, H. P.	Southampton.
Watkins, J	Aldershot.
Wheeler, A.	Shorncliffe.
Wilson, A.	Devonport.
Woolley, H.	Dover.

HONORARY LIEUTENANTS

Clark, J.	Woolwich
Cooper, C. H.	Dublin.
Cope, T. F.	Pretoria.
Gillman, J.	Depôt, Aldershot.
Kinsella, C. W.	Cosham.
McColgin, T. E.	Edinburgh.
Newland, E. W.	Netley.
Osborne, J. W.	Netley.
Saunders, E. V.	Hong Kong.
Smith, C. H.	Cork.
Spencer, W. T.	London.
Tait, A. F.	Aldershot.
Wilson, J.	War Office.

MEDICAL OFFICERS OF THE HOUSEHOLD CAVALRY.

Rank.	Name.	Regiment.
Surg.-Lieutenant-Colonel	Deeble, B. W. C.	1st Life Guards.
Surgeon-Major	Pares, B.	Royal Horse Guards.
„ „	Power, J. H.	2nd Life Guards.
Surgeon-Captain	Bodington, P. J., M.B	Royal Horse Guards.
„ „	Cowie, R. M.	2nd Life Guards.
„ „	Hayes, G. S. C.	1st Life Guards.

MEDICAL OFFICER OF THE BRIGADE OF GUARDS.

Rank.	Name.	Regiment.
Surg.-Lieutenant-Colonel	Bateson, J. F., M.B.	Coldstream Guards.

RETIRED MEDICAL OFFICERS OF THE REGULAR ARMY WHO ARE EMPLOYED.

Name.	Station where Employed.
Allport, Major C. W., M.D.	Great Yarmouth.
Archer Lieut.-Colonel T , M.D.	Lydd.
Austin, Lieut.-Colonel H. W.	Fort Stamford.
Baird, Lieut.-Colonel A., M.B., F.R.C.S.Edin.	Worcester.
Barnes, Lieut. Colonel R. W.	Dorchester.
Battersby, Lieut -Colonel H. L.	Ipswich.
Bourke, Lieut.-Colonel U. J., M.B.	Hamilton.
Browne, Colonel A L., M.D.	Taunton.
Browne, Lieut.-Colonel A. W.	Armagh.
Burke, Major J. F.	Penally.
Butterworth, Major S.	Carlisle.
Charlesworth, Lieut.-Colonel H., C.M.G.	Nottingham.
Clements, Lieut. Colonel W. G.	Christchurch.
Coutts, Lieut.-Colonel G., M.B.	Chichester.
Davis, Lieut.-Col. E.	St. Peters, Jersey.
Davoren, Major V. H. W.	Bury St. Edmund's.
Day, Lieut.-Colonel W. B.	Staff Officer to A.M.O. 2nd London Division Territorial Force, London
Dillon, Major H. V.	Scarborough.
Dowman, Lieut. Colonel W. S.	Northampton.
Duggan, Major C. W., M.B.	Lincoln.
Duncan, Lieut.-Colonel S. E.	Shrewsbury.
Freeman, Major E. C., M.D.	Staff Officer to A.M.O., East Anglian Division Territorial Force, Warley.
Gormley, Lieut.-Colonel J. A., M.D.	Kingston.
Greig, Lieut.-Colonel F. J.	Stirling.
Haywood, Lieut.-Colonel L., M.B.	Staff Officer to A.M.O. South Midland Div. Territorial Force, Birmingham.
Hodson, Lieut.-Colonel R. D.	Trowbridge.
Hosie, Lieut.-Colonel A., M.D.	Sandown.
Irvine, Lieut.-Colonel D. L.	Staff Officer to A.M.O. North Midland Division Territorial Force, Derby.
Jackson, Major R. W. H., M.B.	Lichfield.
James, Lieut.-Colonel H. E. R., C.B., F.R.C.S.	War Office.
Kay, Lieut.-Colonel A. G., M.B.	Clifton, Bristol.
Kearney, Lieut.-Colonel J., M.D.	Wrexham.
Keays, Lieut. Colonel W., F.R.C.S.I.	Weymouth.
McCormack, Major R. J., M.D.	Omagh.
McCreery, Lieut.-Colonel B. T., M.B., F.R.C.S.I.	Perth.
Moir, Major J. D., M.B.	Fort Efford and Mutley District.
Mosse, Lieut -Colonel C. G. D., F.R.C.S.I.	Guernsey.
Myles, Major E. H., M.B.	Guernsey.
Nicolls, Lieut.-Colonel J. M., M.B.	Detention Barracks, Cork.
Osburne, Lieut.-Colonel J.	Galway.

Name.	Station where Employed.
Peeke. Major H. S.	Derby.
Power, Major R. I.	Waterford.
Poynder. Lieut.-Colonel G. F.	Bedford.
Reckitt, Lieut.-Colonel J. D. T.	Staff Officer to A.M.O. 1st London Division Territorial Force, London.
Riordan, Lieut.-Colonel J., M.B.	Clonmel.
Robinson, Surgeon-Lieut.-Colonel G. S.	Eastbourne.
Rowney, Lieut.-Colonel W., M.D.	Manchester.
Scanlan, Lieut.-Colonel A. De C.	Guildford.
Scott, Lieut.-Colonel H., M.B.	Landguard Fort.
Spence, Major A. E. C., M.B.	Warwick.
Trewman, Lieut.-Colonel G. T.	Reading.
Trotter, Major W. J.	Naas.
Tuckey, Lieut.-Colonel T. B. A.	Detention Barracks, York.
Wade, Major G. A., M.D., F.R.C.S.I.	Horfield.
Webb, Colonel C. A.	Staff Officer to A.M.O. Wessex Division Territorial Force, Exeter.
Whitty, Lieut.-Colonel M. J., M.D.	Liverpool.
Wight, Lieut.-Colonel E. O.	Staff Officer to A.M.O. Home Counties Division Territorial Force, Hounslow.
Williamson, Lieut.-Colonel J. G.	Leicester.
Wilson, Lieut.-Colonel E. M., C.B., C.M.G., D.S.O.	Record Office, Aldershot.
Woods, Lieut.-Colonel C. R., M.D.	Birr.
Wright, Major A.	Falmouth.
Zimmermann, Major B. F.	Lancaster.

JOURNAL
OF THE
ROYAL ARMY MEDICAL CORPS.

Corps News.

July, 1911.

ARMY MEDICAL SERVICE.

Colonel Fitzroy B. Maclean is placed on retired pay, dated June 13, 1911. Colonel Maclean entered the Service as a Surgeon, Army Medical Department on March 6, 1880; became Surgeon-Major, Army Medical Staff on March 6, 1892; Lieutenant-Colonel, Royal Army Medical Corps, March 6, 1900; Lieutenant-Colonel with increased pay (under Article 317, Royal Warrant) January 17, 1903, and Colonel, February 6, 1908.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Richard P. Bond retires on retired pay, dated May 19, 1911. Lieutenant-Colonel Bond entered the Service as a Surgeon, Army Medical Department on February 3, 1883; became Surgeon-Major, Army Medical Staff, on February 3, 1895. Lieutenant-Colonel, Royal Army Medical Corps, on February 3, 1903; and Lieutenant-Colonel with increased pay (under Article 317, Royal Warrant) December 23, 1908. His war service is: Soudan Expedition, 1884-5; Nile medal with clasp, bronze star. Soudan, 1885-6-8; Frontier Field Force, Suakin (horse wounded); action at Gamaizah, clasp. South African War, 1899-1900; advance on Kimberley, including actions at Belmont, Enslin, Modder River and Magersfontein. Operations in the Orange Free State, February to May, 1900, including operations at Paardeberg (February 17 to 26); actions at Poplar Grove and Dreifontein. Queen's medal with two clasps.

Lieutenant-Colonel Wilfred B. Thomson is placed on retired pay, dated June 7, 1911. Lieutenant-Colonel Thomson entered the Service as a Surgeon, Army Medical Department, on July 29, 1882; became Surgeon-Major, Army Medical Staff, July 29, 1894; Lieutenant-Colonel, Royal Army Medical Corps, July 29, 1902; and Lieutenant-Colonel with increased pay (under Article 317 Royal Warrant) on October 17, 1908.

The undermentioned Captains to be Majors, dated April 27, 1911: Robert A. Cunningham, M.B.; George G. Delap, D.S.O.; Harold Simson; William R. Blackwell; Henry M. Nicholls, M.B.; Arthur Chopping; Sydney G. Butler; John J. W. Prescott, D.S.O.; Percy H. Falkner; Henry E. M. Douglas, V.C., D.S.O.; Ernest E. Ellery; James W. Langstaff; Leonard Wood; Harold B. Fawcus, M.B.; Evelyn P. Sewell, M.B.

The undermentioned Captains to be Majors, dated May 17, 1911: Lawrence W. Harrison, M.B.; Hugh M. Morton, M.B.; Marcus H. Babington; Horace S. Roch; Frederic Harvey.

The undermentioned Captains to be Majors, dated June 4, 1911: Henry C. R. Hime, M.B.; Charles C. Cumming, M.B.; Charles R. Evans.

Lieutenant Eustace M. Parsons-Smith is seconded for service with the Egyptian Army, dated May 11, 1911.

Captain Harold T. Treves resigns his commission, dated June 10, 1911.

ARRIVALS HOME ON LEAVE.—Colonels F. B. Maclean and T. J. R. Lucas, C.B.; Brevet-Colonel R. S. F. Henderson, K.H.P.; Lieutenant-Colonel H. L. E. White; Majors C. W. R. Healey, J. E. Brogden, A. E. C. Keble, R. J. Blackham, J. V. Forrest, B. Watts, J. S. Gallie, and E. E. Ellery; Captains W. L. Baker, R. J. C. Thompson, J. B. G. Mulligan, M. J. Lochrin, A. D. Fraser, and H. W. Farebrother; Lieutenant C. Clarke.

POSTINGS.—Major P. J. Probyn, D.S.O., Irish Command; Captain C. J. Coppinger, Irish Command; Captain G. W. G. Hughes, Northern Command; Captain C. G. Thomson, Scottish Command; Quartermaster and Honorary Lieutenant T. F. McColgin, Scottish Command.

APPOINTMENTS.—Lieutenant-Colonel M. O'Halloran, charge of the Military Hospital, Canterbury. Captain N. D. Walker, Specialist in Physical Training at the Royal Army Medical College. Lieutenant-Colonel J. Battersby, who recently retired under the age rule from the Corps, has, on the recommendation of His Majesty's Lieutenant for the County, been appointed a Justice of the Peace for the County Tyrone.

QUALIFICATIONS.—Captain A. Dawson has obtained the Diploma in Public Health of the Royal College of Physicians and Surgeons, England, 1911.

MEMORANDUM.

It is notified for general information that the undermentioned Officers will be required to proceed to the Commands specified during the coming trooping season.

Definite orders will be issued through the usual channels, and probable dates of embarkation will be notified as soon as possible.

Officers of the same rank, other than Lieutenant-Colonels, ordered to different foreign stations may, by mutual arrangement, have their stations altered; but while the Director-General is anxious to meet Officers' wishes, it is not always possible to give effect to them. Applications for alteration of station, or for exchanges of position, on the roster for service abroad cannot be considered if received after the formal orders have been issued for Officers to be held in readiness to embark, owing to the serious inconvenience caused. The cases of Lieutenant-Colonels will be considered when possible.

Officers proceeding to India, who may be desirous of being posted to any particular Division, may name any three Divisions in the Army to which they are detailed in order of priority of choice, and every effort will be made in India to meet their wishes.

Northern Army, India

Lieut.-Col. J. Fallon.
,, R. W. Wright.
Major F. J. W. Porter, D.S.O.
,, J. Cowan.
,, A. R. O'Flaherty.
,, R. H. LLoyd.
Captain W. A. Woodside.
,, A. A. Seeds.
,, L. N. Lloyd, D S.O.
,, E. P. Connolly.
,, J. H. Robinson.
,, E. Bennett.
,, A. D. Jameson.
,, F. A. Stephens.
,, R. N. Woodley.
,, J. S Bostock.
,, F. W. W. Dawson.
, J. H. Duguid.
Lieutenant S. S. Dykes.
,, W. H. O'Riordan.
,, P. S. Tomlinson.
Lieutenant F. W. M. Cunningham.
,, A S. M. Winder.
,, V. P. Hutchinson.

Southern Army, India.

Lieut -Col. C. C. Reilly.
,, C. A. Lane.
Major G. S. McLoughlin, D.S.O.
,, C. F. Wanhill.
,, J. M Sloan, D.S.O.
,, J. J. W. Prescott, D.S.O.
,, L. Wood.
Captain J. Tobin.
,, A. R. Greenwood.
,, P. C. Douglass.
,, J. L. Jones.
,, H. A. Bransbury.
,, A. W. Sampey.
Lieutenant R. C. Priest.
,, R. C. Paris.
,, A. W. Bevis.
,, M. J. Williamson.

Lieutenant M. White.
,, J. R. Yourell.

Gibraltar.

Captain R. C. Wilson.
Lieutenant W. G. Wright.
,, J. J. D. Roche.

Malta.

Lieut.-Col. H. M Sloggett.
Captain H. Rogers.

Straits Settlements.

Lieut.-Col. A. Dodd.
Captain A. J. Williamson.

Jamaica.

Lieut.-Col. J. B. Wilson.
Captain A. H. McN. Mitchell.
,, W. J. S. Harvey.
,, M. G. Winder.

Bermuda.

Captain M. W. Falkner.
,, F. E. Rowan Robinson.
Lieutenant J. A. Manifold.

Mauritius.

Major F. M. Parry.
Captain M. F. Foulds.
Lieutenant W. T. McArthur.†

South China.

Lieut.-Col. J. H. Daly.
Captain R. V. Cowey.
Captain A. McMunn.
Lieutenant E. C. Lambkin.

North China.

Lieut.-Col. C. J. Macdonald.
Major C. R. Evans.
Captain E. S. Worthington, M.V.O.

Egypt.

Captain T. J. Potter.*
Lieutenant A. D. Stirling.

Ceylon.

Lieut.-Col. M. L. Hearn.
Major E P. Sewell.†
Captain R. F. M. Fawcett.
,, P. G. Hyde.

South Africa.

Lieut.-Col. M. J. Sexton.
,, J. Donaldson.
Major H. S. Roch.*
Captain C. H. Straton.†
,, J P. J. Murphy.†
,, C. E. Fleming.
Lieutenant C. T. V. Benson.
,, G. P. Taylor.
,, O. W. McSheehy.
,, C. L. Franklin.
,, J. R. Hill.
,, H. F. Joynt.
,, H. R. Edwards.

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* As clinical pathologists.
† As sanitary officers.

The destinations of Lieutenant-Colonels R. Kirkpatrick, C.M.G., and T. G. Lavie will be notified later.

The changes in the list issued in March are due to casualties and to extensions of tours, and the "waiting" list will now be as follows:—

Lieut.-Col. J. J. C. Donnet.
,, M. O'Halloran.
Major R. J. W. Mawhinny.
,, St J. B. Killery.
Captain W. J. Waters.
Captain W. M. B. Sparkes.
Lieutenant R. M. Davies.
,, R. C. G. Kinkead.
,, E. C. Stoney.
,, T. W. Stallybrass.

RESULTS OF EXAMINATIONS.

Passed for promotion to the rank of Captain in (b): W. P. MacArthur.

NOTES FROM MALTA.—Serjeant-Major Collard writes, June, 1911: "My notes for the Journal were belated last month owing to mobilization following tactical operations. We had a busy time from May 1 to 13. Ten N.C.O.'s and men were sent with battalions, and nine to forts. One section of the Field Ambulance supplemented by thirty men of the Royal Malta Artillery was mobilized under the command of Captain Hartigan. They had plenty of marching during this period and returned without having a casualty amongst them; marching on three consecutive days they covered about 60 miles. With one day's rest the total distance was about 80 miles in all. The unit had a test at Binjemma, receiving over fifty apparently wounded. Several of the men in forts had a test in First Aid; they had also to arrange for the conveyance of the apparently wounded to the various hospitals. The performance was very creditable.

"At the recent examinations there were fourteen candidates for A.F.C. 344; eight for Part 'A' and four for Part 'B' Dispensing; one Corporal for Serjeant, and three Privates for Corporals.

"The following have gained the 1st Class Certificate of Education: No. 2083 Private W. G. Pearce, No. 672 Private A. Stevens.

"Passed in Group II.: No. 17843 Serjeant R. C. Blair, No. 935 Private Griffith-Williams.

"Friday, April 28, will long be remembered by many of those who worship at the shrine of Terpischore, the occasion being the Annual Ball of the Royal Army Medical Corps, Cottonera. Verdala Gymnasium, where it was held, had been converted for the occasion into a perfect ball-room. The room was quickly filling up, when at 8.30 p.m. the orchestra opened the proceedings with an overture, twenty-two dances being afterwards indulged in without the slightest hitch to mar the proceedings.

"One of the features of the evening was the competition for the best dancing of the 'Zerlena Valse.' The thirty couples who entered for this competition were such good dancers that it was extremely difficult to adjudge the winners. The Royal Army Medical Corps Juniors who introduced this dance in Malta appointed their Committee as judges in the preliminary round. The eight successful couples from the preliminary round were then judged per ballot by six ladies and six gentlemen chosen from amongst the visitors present.

"Mrs. Russell kindly presented the prizes as follows 1st Prize - Miss Thorpe (satin-lined work basket) and Corporal Hipperson, A.S C (case of four razors and brush); 2nd Prize - Miss Budgen (silver-mounted umbrella) and Private McCarthy, A S C. (writing cabinet); 3rd Prize—Miss Kean (writing case) and A. W. Wilkinson, H.M.S. 'Ardent' (Swan fountain pen).

"Serjeant-Major Collard, in thanking Mrs. Russell for so kindly consenting to present the prizes, remarked that it was very gratifying to the members of the Headquarters Royal Army Medical Corps to witness the enthusiasm and the excellent result of their venture. He did not know whether it was an innovation or whether competitions had been attempted before on this Island, but if they had, it showed that the Corps was not going to be left behind.

"During the interval which followed the Corps again upheld their reputation as hosts. The refreshments which were served round by the efficient staff of waiters (though temporary) being up to the highest possible standard as regards quality, while the quantity was to everybody's satisfaction.

"While the inner person was being attended to the outer was also busy this time witnessing lightning sketches cleverly executed by Private J. D. Powell, R.A.M.C.

"The interval over dancing was again resumed, over 150 couples forming up for the Grand March Lancers.

"It was past 3 in the morning when 'God Save the King' brought the proceedings to a close, and on every side the remark could be heard 'Roll on next season.'

"*Committee.*—President: Serjeant-Major F. E. Collard; Members: Private J. Andre (Honorary Secretary), Private J. D. Powell (Master of Ceremonies), Corporal P. C. Martin, Privates R. Herbert, J. Parsons, G. E. Sayers, R. Allen.

"Amongst those present were Lieutenant-Colonel A. F. Russell, C.M.G., and Mrs. and Miss Russell, Lieutenant-Colonel and Mrs. H. L. Esmonde White, Captain and Mrs. Baker, Captain and Mrs. Beaman, Captains Babington, Hartigan, Marett, Leslie, and Mulligan, Lieutenant and Mrs. Suhr, Major and Quartermaster and Mrs. Hasell.

"The greatest praise is due to Private Andre (the Honorary Secretary), and Private Powell (the Master of Ceremonies), since the success of the dance was in a great measure due to their combined efforts.

"The orchestra, under the able baton of Mr. Sceberras, was all that could be desired.

"The Royal Army Medical Corps Serjeants Sports Club held an 'At Home' in the Cottonera Hospital Grounds on April 17, and about fifty were present. Tea was served on the tennis court.

"The Commanding Officer was absent on leave, but we were honoured with the presence of Mrs. Russell, Captain Babington, and several officers and families, the Matron, Miss Hoadley, and ladies, Q.A.I.M.N.S

"Guessing competition—culinary articles—for ladies, proved very interesting.

"Missing word competition, also for ladies, caused great fun.

"Clock golf was found very popular with both sexes.

"The race for gentlemen was very amusing.

"Canadian Chute minus the water was well patronized by the kiddies, with other minor events and sports for children, Aunt Sally, Badminton, tennis, and other games for the elders.

"The concluding event was a 'Tom Bowler.'

"The rifle range was greatly missed. A new one with 25 yards range was all but completed. This is being constructed on St. James' Bastion (above the tennis court). The target is situated on an old gun emplacement, the firing point facing east.

"The whole arrangements were very successful, and in the hands of Quartermaster-Serjeant Gibbs, to whom great credit is due.

"Since the opening of the cricket season we have only suffered one reverse."

NOTES FROM HONG KONG.—Serjeant-Major Edser, writes, May 22, 1911:—"The following remarks about Hong Kong and No. 27 Company may be of interest to those who have served, or who are desirous of serving at that station:—

"Hong Kong is one of the most picturesque spots in the world. Whether viewed from the harbour, the mainland, or the island itself, by day or night, one cannot fail to be greatly impressed by its grandeur.

"The hospital is situated about 500 ft. above the sea-level, its position being quite the best on the island; it is below the thick, white (and wet) mist, which for days at a time, at some periods of the year, completely enshrouds the 'Peak' and higher levels. It is also well above the thickly populated city where the heat is greatest during the summer. The wards are excellent, being very roomy, also well-lighted and ventilated, even on the hottest day a breeze can generally be obtained.

"The barracks for the Royal Army Medical Corps are also in a good position and are, or at least will be when the installation of electric light is completed, very comfortable, practically the only things lacking are, Regimental Institutes, and room for recreation. The former will, no doubt, be provided at some future date, and as regards the latter it will surprise some of the old members of the Company to hear that we now have a full-sized 'cricket pitch' within the precincts of the hospital, where we can practice. Of course it has to be surrounded and covered in with netting. The result of this is seen in the much greater number of matches won this summer.

"The football enthusiasts also manage to get some training and a little amusement, in a small corner about 20 yards long and a few yards wide, with a dead wall on one side and buildings on the other. They have also quite held their own in the matches played.

"The commencement of the year from a military point of view is the arrival of the troopship, which is preceded by the ceremony of hoisting 'paying off pennants' in the garrison, on the day the boat is due to leave England; this being performed with great enthusiasm. At the hospital last year, the 'Diabolo,' or 1907 draft, hoisted their pennant in the midst of a pyrotechnic display, accompanied by hearty cheering, and continuous ringing of the kitchen bell, much to the edification of the 'Aviators' (1909 draft).

"The fortnight or so which the 'trooper' spends in harbour here, is a very strenuous period, the number of smoking concerts (welcoming and farewell), cricket matches, picnics, &c., arranged and carried out is marvellous, considering the extra work that has to be done at such a time.

"Almost before the new drafts have settled down, Christmas is upon them. This festival is celebrated in the same hearty fashion as elsewhere, while the spirit of good fellowship among all ranks of the Corps and the endeavour of every individual to make it a real happy time for all (including the patients and married families), cannot possibly be excelled.

"The next event of importance is Chinese New Year, about the end of January or early in February, the celebration of which is one of the sights of the East. John Chinaman does this thoroughly, the coolie and servant class cease work for three or four days, and although this is more than awkward for the Europeen one does not grudge it to them, this being the only holiday they take during the year. All business houses close for the same period and every individual simply gives himself up to enjoyment. The streets, which for miles are lined on each side with stalls loaded with all kinds of weird and wonderful articles, are packed with many thousands of Chinese in most gorgeous dresses, and, in addition, the greater part of the European population, who are mostly attracted by curiosity, and the chance of obtaining curios at reasonable prices, although it is generally our friend John who gets the best of the bargaining. This huge crowd of Chinese is, I am sure, one of the most good-humoured, sober and orderly crowds one could mix with, although the noise caused by the incessant discharge of fireworks is deafening.

"One week in February is given over to racing. Practically 'All the world and his wife' as far as the colony is concerned, ceases business and musters at the Happy Valley, which is a most beautiful race-course surrounded by green-clad hills. While the races are in progress the spectacle is one that cannot easily be forgotten, such a variety of nations and races being represented, the greater number of whom are dressed in costumes peculiar to their respective countries, the colours only would make a rainbow look dull by comparison. After this race meeting, Gymkhanas are held at the same place about once a month.

"Practically the only recreation possible during the summer months is bathing, water-polo and launch picnics. Tennis is played for an hour or two in the evening. The two former are by far the most pleasant way of taking exercise at this season. A War Department launch is used daily, Sundays excepted, for 'bathing parades,' taking the troops from Victoria to Stonecutter's Island, a distance of five miles. These parades are very popular, each unit having the opportunity twice a week.

"No. 27 Company has its annual picnic, always a most enjoyable function. Last year they selected Junk Bay, and a merry party embarked on the good ship 'Omphale.' Unfortunately, on arrival at Junk Bay, a heavy rain commenced and continued until it was time to return, so instead of landing, tea was served on board. Most of the male members were quickly overboard, the temperature of the water being ideal, swimming and diving competitions were arranged for the boys, while various other amusements were organized for the ladies. It was unanimously voted a most successful day in spite of the weather, Staff-Serjeant Warsop and his hardworking committee receiving the well-deserved praise of the whole party.

"The cricket and football season runs from October to March, and during this period Hong Kong is a most delightful place, having glorious weather practically the whole time.

"Last season our football team under the captaincy of Private Stammers played 14 matches, of which 6 were won, 6 lost, and 2 drawn, with a total of goals: for 31, against 24. This is a creditable record, considering the team has no facilities for practice, but we are looking forward to much better results next year.

"Captain Waring was our cricket captain, with Serjeant Wills as vice-captain, the total matches being played being 30. Results: won 15, lost 14, drawn 1.

"Great thanks are due to our Principal Medical Officer, Colonel W. G. A. Bedford, C.M.G., and the remainder of our officers for their generous help towards providing the above-mentioned cricket pitch and support for the Recreation Fund, and especially to Lieutenant-Colonel Sir Joseph Fayrer, Bart., Major F. S. Penny, Captains A. D. Waring and B. A. Craig, for their valuable assistance on the field, given often at great personal inconvenience. A reference to the averages will show that no small amount of our success was due to their skill with the bat. Our most successful bowlers were Quartermaster-Serjeant Davis, Private Riley and Serjeant Worswick. Private Stammers has developed into a most useful wicket-keeper.

"We have suffered a serious loss, one which will be felt for some time to come, viz., our Commanding Officer, Lieutenant-Colonel Sir Joseph Fayrer, Bart , who has been selected for the position of Superintendent, Royal Infirmary, Edinburgh, in which sphere we wish him every success and happiness. He will never be forgotten by those whose good fortune it was to serve under him. He was a real father to his Company.

"I enclose an extract from the local press giving an account of the wedding of Miss A. J. St. Clair (not reproduced—Ed.), who until recently was one of our Staff Nurses. No. 27 Company and our married families received invitations to be present at the ceremony and subsequent reception, and all who could possibly leave the hospital attended.

"The undermentioned are tour expired this year: Captains B. A. Craig, W. J. E. Bell, and H. M. J. Perry, Staff-Serjeant Warsop, Serjeants Dunglison, Strange, and Wills, and twelve privates.

"Now just one glance at the other side of the picture.

"Malarial fever, in spite of the great success of the vigorous campaign carried out against it by our untiring Principal Medical Officer and Specialist Sanitary Officer, is still our most formidable enemy.

"Last summer distinctly favoured the disease, the total admissions rising from 269 in 1909 to 334. The Royal Army Medical Corps were particularly hard hit, the percentage of admissions to strength of the Company being 36, and of our women and children 71 per cent. of the former, and 61 per cent. of the latter suffered from this scourge. At one period a sixth of the Company was in hospital, so one can realize the amount of hard work thrown on the remainder, at a time when the hospital was full of malaria cases. Fortunately the officers and members of the Queen Alexandra's Imperial Military Nursing Service escaped admission from this disease."

R.A.M.C. CRICKET CLUB, HONG KONG, 1910-11.

Batting Averages.

	Number of innings	Times not out	Most in innings	Total runs	Average
Major F. S. Penny	18	5	62	286	22·00
Lieutenant-Colonel Sir J. Fayrer	12	0	42	187	15·58
Quartermaster-Serjeant F. Davis	22	3	49*	231	12·16
Serjeant P. Wills	22	2	37	217	10·85
Serjeant-Major E. Edser	30	0	25	316	10·53
Captain B. A. Craig	5	1	22	41	10·25
,, A. D. Waring	16	0	46	162	10·12
Private E. Riley	25	1	35	29	9·12
Serjeant J. Worswick	25	0	26	216	8·64
,, W. C. Prince	11	4	26	56	8·00
Private H. A. Claridge	12	4	12*	49	6·12
,, A. Stammers	25	0	33	143	5·72
,, J. W. D. Haigh	15	5	10*	49	4·90
Staff-Serjeant H. Warsop	16	2	12	56	4·00
Private J. White	13	2	13	35	3·20
,, W. Hill	8	0	5	15	1·98

* Signifies not out.

Bowling Averages.

	Number of overs	Number of mds.	Number of wkts.	Total runs	Average per wkt.
Private E. Riley	137	5	72	489	6·79
Serjeant J. Worswick	75	8	34	260	7·64
Quartermaster Serjeant F. Davis	161	10	78	644	8·25
Serjeant P. Wills	111	12	32	405	12·65
Private W. Hill	64	6	16	218	13·60
Lieutenant-Colonel Sir J. Fayrer	51	4	19	299	15·73
Staff-Serjeant H. Warsop	29	0	8	189	23·62

NOTES FROM SIMLA.—Major H. G. F. Stallard, R.A.M.C., officiating Secretary to the Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated May 18, 1911:—

"*Appointments.*—Lieutenant-Colonel C. T. Blackwell, R.A.M.C., has been appointed to the command of the Station Hospital, Rangoon.

"Major H. G. F. Stallard, R.A.M.C., has been appointed to officiate as Secretary to the Principal Medical Officer, His Majesty's Forces in India, during the absence on leave of Brevet-Colonel R. S. F. Henderson, K.H.P., R.A.M.C.

"Major E. C. Anderson, R.A.M.C., has been transferred to the 4th (Quetta) Division for the temporary command of the Station Hospital, Karachi.

"*Extensions.*—The undermentioned officers have been granted an extension of their Indian tour of service: Majors F. Smith, D.S.O., R.A.M.C., G. St. C. Thom, R.A.M.C., G. B. Riddick, R.A.M.C.; Captains R. L. Argles, R.A.M.C., P. S. Lelean, R.A.M.C., G. B. F. Churchill, R.A.M.C., T. B. Moriarty, R.A.M.C., M. B. H. Ritchie, R.A.M.C.

"*Leave.*—Brevet-Colonel R. S. F. Henderson, K.H.P., R.A.M.C., has been granted privilege leave for ninety days ex-India from May 16, 1911. The grant of general leave out of India to the undermentioned officers has been concurred in: Lieutenant-Colonel L. T. M. Nash, R.A.M.C., for six months from June 15, 1911. Major C. W. R. Healey, R.A.M.C., for three months from May 6, 1911.

"*Retirements.*—The undermentioned officers retire with effect from the dates specified: Colonel F. B. Maclean, June 13, 1911. Lieutenant-Colonel W. B. Thomson, R.A.M.C., June 7, 1911.

"*Specialists.*—Captain F. J. Stuart, R.A.M.C., is appointed a specialist in prevention of disease with charge of Brigade Laboratory at Fyzabad.

"Captain A. Dawson, R.A.M.C., is recognized a specialist in prevention of disease and appointed to the charge of enteric fever Convalescent Depot at Wellington."

DISCHARGES.

7191	S.-Serj. ..	Mellon, W. H. ..	14.5.11	After 3 months' notice.
8775	,, ..	Pinder, R.	30.5.11	Termination of second period.
8777	,, ..	Landon, J. E. ..	2.6.11	,, ,, ,,
8770	Serjeant ..	Wilson, R.	22 5.11	,, ,, ,,
10070	Corporal ..	Parrott, A.	30.5.11	Medically unfit.
7233	Lce.-Corpl.	Bond, C. A. ..	29.5.11	After 3 months' notice.
9678	Private ..	Ellis, T.	29 5.11	Medically unfit.
12628	Corporal ..	Lunney, J. R. ..	4.6.11	Termination of first period.

TRANSFERS TO ARMY RESERVE.

18710	Pte	Tebbutt, A. ..	10.5.11	18773	Pte.	Sherry, G. ..	25.5.11
18699	,,	Russell, J. ..	7.5.11	19049	,,	Freeman, J. H.	23.5.11
18722	,,	Leach, J. ..	12.5.11	18741	L.-Cpl	Fernie, S. D. ..	20.5.11
18711	,,	Ball, W. ..	10 5.11	18932	Crpl.	Milton, D. ..	25 5.11
1826	,,	Horn, J. ..	14.5.11	18779	Pte.	Savage, K. ..	20.5.11
18735	,,	Forge, W. F. V.	15.5.11	19052	,,	Grey, S. E. ..	24.5.11
1827	,,	Spratt, T. F. ..	15.5.11	18760	,,	Boyd, A. J. ..	20.5.11
2244	,,	Cate, T.	17.5.11	18775	,,	Muir, W. R. ..	27.5.11
18733	L.-Cpl.	Mackenzie, A. ..	14.5.11	18782	,,	Merrick, W. J...	31.5.11
155	Pte.	Carter, S. J. ..	26.5 11	4482	,,	Hook, B. J. ..	31.5.11
19041	,,	Thompson, W...	17.5.11	18819	,,	Hayes, G. ..	3.6.11
18753	,,	Elvin, A. R. ..	18.5.11	18809	,,	Mann, J. ..	7.6 11
18752	,,	Mitchell, W. G.	18 5 11	18807	,,	Kendall, J. ..	7 6.11
18766	,,	Wardale, W. ..	19.5.11	19073	,,	Leach, E. W. ..	8.6.11
18690	,,	Parkins, A. E ..	4.5.11	5167	,,	Squires, H. R. ..	9.6.11
1828	,,	Connolly, M. ..	21.5.11	18825	,,	Monaghan, J. ..	10.6 11
18904	,,	Aarons, S... ..	22.5.11	1480	,,	Tillett, J. ..	9.6.11
5238	,,	Mercer, J. G. ..	21 5.11	18823	,,	Turner, F. C. ..	9.6.11
19789	,,	Wallis, L. F. ..	23 5.11				

TRANSFERS TO OTHER CORPS.

11059	S.-Serjeant	Dunn, J.	17.5.11	To 2nd Lowland F. Ambulance
5461	Private ..	Harris, R.	6.6.11	To Ox. and Bucks. L.I.

TRANSFERS FROM OTHER CORPS.

5521	Private ..	Brown, F.	15.5.11	

REJOINED FROM P.S. TERRITORIAL FORCE.

11583	Serjeant ..	McCarthy, W. ..	15.5.11	

THE FOLLOWING N.C.O.'S AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

For Quartermaster-Serjeant.

10188	S.-Serj. ..	Manwaring, R. E.			

For Staff-Serjeant.

18149	Serjeant	Godfrey, A. H.	15096	Serjeant	Pugh, J. E.
10762	,,	Edwards, C. H.	12510	,,	Redwood, F. J.
18145	,,	Elliott, F. H.	18239	,,	Roland, R. F.
12365	,,	Brodie, W. L.	17229	,,	Hutchens, W.
9457	,,	Griffiths, W.	15670	,,	Goodread, F. W.
13317	,,	Wheeler, C. F.	17542	,,	Colgan, R.

For Serjeant.

12819	Lce.-Serj.	Riches, W. H.	19618	Corporal	Bettison, P.
18122	,,	Kirby, J. A.	13310	,,	West, S.
12038	,,	Garlick, I. H.	12592	,,	Fraser, J. G.
19320	Corporal	Ritchie, H. A.			

For Corporal.

19133	Private	Dewhurst, J. C.	365	Private	Warner, W. O.
16462	,,	Buchanan, A. A.	1141	,,	Dyson, H. A.
12272	,,	King, F.	1569	,,	Farmer, G. L.
15549	,,	Ennis, H	1584	,,	Phillips, W. E.
4763	,,	Watson, E. R.	1751	,,	Haum, F. H.
16303	,,	Cunningham, H.	2069	,,	Wilby, H.
87	,,	Woodley, A. W.	4593	,,	Martin, P. G.
19756	,,	Wallace, W. E.			

QUALIFIED AS DISPENSERS.

10638	Serjeant	George, F.	1843	Private	Mack, C. A.
13921	Corporal	Cooper, J. W.	1305	,,	Prince, H. M.
12242	,,	Luxton, A. J.	4882	,,	Summers, F. G.
12712	,,	Hutchinson, W.	19282	,,	Golden, H.
11929	,,	Cooper, W. J.	11040	Corporal	Stroud. J.
19086	Private	Wain, A.	2137	Private	Crack, F.
17506	Corporal	Blong, P.	12547	Corporal	Triggs, A.
1905	Private	Eves, J. G.	19160	Private	Preston, C. J.
19884	,,	Hort, F. E.	16304	Corporal	Langley, A.
17060	Corporal	Reeves, S.	17244	,,	McArthur, A. F.
11440	,,	Farmer, A.	19272	Private	Lee, W. J.
12669	,,	Grinham, C. W.	19547	,,	Mansell, W. A.
14888	,,	Currell, H.	13035	Corporal	Chandler, G. W.
15783	,,	Lloyd. E. F H.			

AWARD OF FIRST-CLASS CERTIFICATES OF EDUCATION.

11603	S.-Serjt.	Clegg, W.	672	Private	Stevens, A.
10892	,,	Reeve, H. J.	1757	,,	Marshall, W. J.
11419	,,	McClelland, J. H.	2098	,,	Taylor, E. E.
14851	,,	Willsher, C. B.	2258	,,	Edmonds, W.
15808	Serjeant	Primer, C.	4356	,,	Woodman, R.
18445	,,	Crawley, J. E.	4357	,,	Harding, T. H.
2257	Bugler	Lever, T. J.	5369	,,	Macfie, T. G.
19805	Private	Hanrahan, J.	5328	,,	Maydon, F.
24	,,	Haynes, P. H.	2197	Boy	Dryden, W. F.

APPOINTMENTS.

The following appointments to complete Establishment will take effect from the dates specified:—

LANCE-CORPORALS.

19282	Private ..	Golden, H.	9.6.11	Special under para. 281, S.O. R.A.M.C.
19805	,, ..	Hanrahan, J. ..	9.6.11	Special under para. 281, S.O. R.A.M.C.
1843	,, ..	Mack, C. A. ..	9.6.11	Special under para. 281, S.O. R.A.M.C.
1905	,, ..	Eves, J. G.	9.6.11	Special under para. 281, S.O. R.A.M.C.

DEATH.

Pensioner Quartermaster-Serjeant J. H. Curtayne, employed as Medical Storekeeper under the Colonial Office, died on June 7, 1911, from malarial fever.

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

Lieutenant Edward H. Rainey resigns his commission, dated May 27, 1911.

John James McIntosh Shaw, M.B., to be Lieutenant (on probation), dated April 29, 1911.

CHANNEL ISLANDS MILITIA.

THE ROYAL MILITIA OF THE ISLAND OF JERSEY.

Medical Company.—Surgeon-Captain Hardwick le Cronier resigns his commission, dated May 13, 1911.

TERRITORIAL FORCE.

YEOMANRY.

Shropshire Yeomanry.—Surgeon-Lieutenant-Colonel John D. Lloyd resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated June 8, 1911.

INFANTRY.

5th (Renfrewshire) Battalion, Princess Louise's (Argyll and Sutherland Highlanders).—Surgeon-Captain Claude W. Marshall, M.B., resigns his commission, dated May 24, 1911.

2nd Battalion, The Monmouthshire Regiment.—Surgeon-Lieutenant Colonel and Honorary Surgeon-Colonel James R. Essex resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated May 24, 1911.

7th (Merioneth and Montgomery) Battalion, The Royal Welsh Fusiliers.—Surgeon-Lieutenant William R. Williams to be Surgeon-Captain, dated November 12, 1910.

5th Battalion, The Welsh Regiment —Surgeon-Captain Evan J. T. Jones has been permitted to henceforth take and use the surname of Cory only in lieu and instead of Jones.

4th (Cumberland and Westmoreland) Battalion, The Border Regiment.—Surgeon-Lieutenant-Colonel and Honorary Surgeon-Colonel George W. Brumwell resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated June 10, 1911.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Charles Averill, M.D., to be Sanitary Officer of a Territorial Division, dated May 20, 1911.

Major William James Howarth, M.D., Sanitary Service, to be appointed Sanitary Officer of a Territorial Division, *vice* Lieutenant-Colonel Arthur Newsholme, M.D., who resigns that appointment, and who is placed on the list of Sanitary Officers whose services will be available on mobilization, with precedence as from August 22, 1908, dated May 20, 1911.

1st East Lancashire Field Ambulance, Royal Army Medical Corps.—Supernumerary Major William B. Pritchard ceases to serve with No. 18 Field Ambulance, Royal Army Medical Corps, Special Reserve, and is restored to the establishment, dated May 20, 1911.

Major William Leonard Bentley, from the 3rd East Lancashire Field Ambulance, Royal Army Medical Corps, to be Major, dated May 20, 1911.

2nd East Lancashire Field Ambulance, Royal Army Medical Corps.—Major William Bridgett Pritchard, from the 1st East Lancashire Field Ambulance, Royal Army Medical Corps, to be Major, dated May 20, 1911.

2nd Eastern General Hospital, Royal Army Medical Corps.—The undermentioned officers resign their commissions, dated May 20, 1911:—

Lieutenant-Colonel Henry S. Branfoot, M.B.

Lieutenant-Colonel Thomas J. Verrall.

1st Highland Field Ambulance, Royal Army Medical Corps.—Alfred John Williamson, M.B., to be Lieutenant, dated April 21, 1911.

3rd Home Counties Field Ambulance, Royal Army Medical Corps.—James Barkley (late Lieutenant, Royal Army Medical Corps) to be Lieutenant, dated April 8, 1911.

3rd Northern General Hospital, Royal Army Medical Corps.—Captain Stanley Riseley, M.B., to be Major, dated January 3, 1911.

South-Eastern Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Joseph Ernest Ryan, M.B., to be Lieutenant, dated February 1, 1911.

2nd South Midland Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Lieutenant Douglas W. A. Bull, M.B., resigns his commission, dated June 10, 1911.

3rd North Midland Field Ambulance, Royal Army Medical Corps.—Lieutenant Andrew Edward Hodder, M.B., from the List of Officers attached to Units other than Medical Units, to be Lieutenant, ceasing to serve with No. 18 Field Ambulance, Royal Army Medical Corps, Special Reserve, dated April 5, 1911.

2nd South Midland Field Ambulance, Royal Army Medical Corps.—Seymour Cartmell Wright to be Quartermaster, with the honorary rank of Lieutenant, dated May 1, 1911.

1st Wessex Field Ambulance, Royal Army Medical Corps.—Langford George Davies, M.B., to be Lieutenant, dated March 13, 1911.

Lieutenant Frederick William Kerr Tough, F.R.C.S.Edin., from the 1st West Lancashire Field Ambulance, Royal Army Medical Corps to be Lieutenant, dated March 8, 1911.

Robert Wilfred Simpson, M.B., to be Lieutenant, dated March 28, 1911.

Cadet Corporal Rudolph Albert Peters, from the Cambridge University Contingent, Senior Division, Officers' Training Corps, to be Lieutenant (on probation), dated June 3, 1911.

Lieutenant (on probation) Rudolph A. Peters is seconded for service with the medical unit of the Cambridge University Contingent, Senior Division, Officers' Training Corps, dated June 3, 1911.

Lieutenant-Colonel William Nettle resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated June 10, 1911.

Lieutenant John E. Phillips resigns his commission, dated June 10, 1911.

Officers attached to Units other than medical.

Lieutenant York T. G. Moore to be Captain, dated April 1, 1911.

Lieutenant Robert J. W. Oswald to be Captain, dated April 1, 1911.

Angus MacNab, M.B., F.R.C.S.Eng., to be Lieutenant, dated March 1, 1911.

James Wilson McIntosh, M.B., to be Lieutenant, dated February 7, 1911.

William Frederick McAllister-Hewlings (formerly Surgeon-Lieutenant, 1st Volunteer Battalion the Leicestershire Regiment), to be Captain, dated March 16, 1911.

Joseph Mary Aloysius Costello, M.B., from 3rd South Midland Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated March 31, 1911.

Lieutenant Thomas J. Faulder to be Captain, dated January 9, 1911.

The undermentioned officers resign their commissions and are granted permission to retain their rank, and to wear the prescribed uniform, dated May 20, 1911:—

Lieutenant-Colonel and Honorary Surgeon-Colonel William D. Waterhouse.

Lieutenant-Colonel Alexander D. Fraser, M.D.

The undermentioned officers resign their commissions, dated May 20, 1911:—

Lieutenant William Cockburn, M.B.

Lieutenant Thomas S. Worboys.

Arthur Donald John Bedward Williams to be Lieutenant, dated February 11, 1911.

Captain James P. Brown, M.B., to be Major, dated April 13, 1911.

Captain Robert T. Ferguson, M.B., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated May 24, 1911.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Sisters: Miss M. E. Harding, to Netley, from Cork; Miss E. L. McAllister, to Cork, from Shorncliffe; Miss L. E. Mackay, to Shorncliffe, on return from Egypt; Miss M. Pedler, to Alexandria, Egypt, from Cairo. Staff Nurses: Miss A. Weir, to Malta, from Curragh; Miss G. H. Sellar, to Cairo, on arrival in Egypt; Miss K. F. G. Skinner, to Cairo, on arrival in Egypt; Miss E. F. Roberts, to Aldershot, from Woolwich; Miss R. C. S. Carleton, to Woolwich, from Aldershot; Miss I. McM. Beaton, to Devonport, from London; Miss M. E. B. Eyton, to Woolwich, on appointment; Miss E. Dearberg, to London, on appointment.

Promotions.—The undermentioned Staff Nurses to be Sisters: Miss M. Barton, Miss C. W. Jones.

Appointments Confirmed.—Staff Nurses: Miss G. St. G. Horne, Miss C. W. Mann, Miss I. M. Whyte.

Arrivals.—Miss L. E. Mackay, Sister, from Egypt; Miss M. Tedman, Staff Nurse, from Malta.

ROYAL ARMY MEDICAL CORPS ANNUAL DINNER, 1911.

THE Annual Dinner was held in the Picture Rooms, at the Prince's Restaurant, on Monday, June 12, at 8 p.m., the Director-General in the chair. Mr. Vesey Holt was the only guest. Dinner was served for 252. The following officers were present:—

Surgeon-Generals.—The Director-General, Army Medical Service, Surgeon-General W. L. Gubbins, C.B., M.V.O., K.H.S., W. Babtie, V.C., C.M.G., G. D. Bourke, C.B., K.H.P., A. F. Bradshaw, C.B., K.H.P., W. F. Burnett, Sir Chas. McD. Cuffe, K.C.B., W. Donovan, C.B., J. C. Dorman, C.M.G., K.H.P., P. M. Ellis, G. J. H. Evatt, C.B., W. W. Kenny, K.H.S., Sir Alfred Keogh, K.C.B., W. H. McNamara, C.B., C.M.G., J. E. Moffatt, H. S. Muir, C.B., G. W. Robinson, Sir Wm. Taylor, K.C.B., K.H.P.

Deputy Surgeon Generals.—W. G. Don, J. H. Jeffcoat, E. M. Sinclair, C.B.

Colonels.—J. M. Beamish, A. L. Browne, Sir D. Bruce, Knt., C.B., F.R.S., W. L. Chester, J. C. Culling, R. W. Ford, D.S.O., C. E. Harrison, C.V.O., J. G. Harwood, H. Hathaway, R. S. F. Henderson, K.H.P., F. J. Jencken, R. Jennings, K.H.S., W. Johnston, C.B., T. J. R. Lucas, C.B., W. A. May, C.B., J. McNamara, H. W. Murray, T. J. O'Donnell, D.S.O., M. W. O'Keeffe, A. Peterkin, S. K. Ray, D. Wardrop, T. P. Woodhouse.

Surgeon-Colonel.—W. T. Martin.

Brigade-Surgeon.—W. J. Wilson.

Lieutenant-Colonels.—A. P. Aldridge, F. E. Barrow, J. F. Beattie, A. P. Blenkinsop, C. H. Burtchaell, A. F. S. Clarke, T. H. F. Clarkson, A. B. Cottell, J. J. Crean, G. Cree, A. M. Davies, W. Dick, A. Dodd, J. Donaldson, W. S. Dowman, E. Eckersley, J. Fallon, C. E. Faunce, N. Ferguson, C.M.G., C. Garner, J. A. Gormley, F. W. H. D. Harris, H. A. Haines, A. P. Hart, M. L. Hearn, R. D. Hodson, W. H. Horrocks, J. D. Hunter, D.S.O., C. L. Josling, R. Kirkpatrick, C.M.G., C. A. Lane, G. T. Langridge, F. S. Le Quesne, V.C., Sir W. B. Leishman, Knt., F.R.S., S. F. Lougheed, C.M.G., A. A. Macrobin, J. Maher, J. Meek, C. H. Melville, R. R. H. Moore, R. F. O'Brien, D. M. O'Callaghan, D. V. O'Connell, M. O'Halloran, W. H. Pinches, W. W. Pope, J. M. Reid, C. C. Reilly, M. W. Russell, R. J. S. Simpson, C.M.G., H. M. Sloggett, C. Stonham, C.M.G., A. A. Sutton, D.S.O., W. T. Swan, F. H. Treherne, G. T. Trewman, C. R. Tyrrell, T. du B. Whaite, H. L. E. White, E. M. Wilson, C.B., C.M.G., D.S.O., G. Wilson, J. B. Wilson, T. B. Winter, M. T. Yarr.

Majors.—J. H. E. Austin, K. B. Burnett, F. W. Begbie, W. W. O. Beveridge, D.S.O., E. T. F. Birrell, F. J. Brakenridge, G. Bray, H. A. Bray, A. Bruce, J. H. Campbell, D.S.O., J. E. Carter, T. H. M. Clarke, C.M.G., D.S.O., S. F. Clark, R. J. Copeland, J. Cowan, C. C. Cumming, S. L. Cummins, G. G. Delap, D.S.O., H. E. M. Douglas, V.C., D.S.O., P. Evans, F. G. Faichnie, J. D. Ferguson, D.S.O., B. Forde, J. V. Forrest, E. C. Freeman, R. S. H. Fuhr, D.S.O., T. W. Gibbard, W. L. Gray, S. F. Green, F. E. Gunter, W. E. Hardy, L. W. Harrison, W. S. Harrison, E. C. Hayes, F. C. J. Heffernan, H. Hewetson, H. A. Hinge, J. W. H. Houghton, H. A. L. Howell, J. C. Jameson, T. P. Jones, F. Kiddle, J. W. Langstaff, B. W. Longhurst, J. A. O. MacCarthy, T. McDermott, S. MacDonald, G. S. McLoughlin, D.S.O., J. R. McMunn, C. B. Martin, L. A. Mitchell, G. A. Moore, S. G. Moores, L. P. More, C. K. Morgan, W. T. Mould, A. R. O'Flaherty, L. E. L. Parker, E. M. Pilcher, D.S.O., C. E. Pollock, F. J. W. Porter, D.S.O., J. J. W.

Prescott, D.S.O., C. W. Profeit, B. H. Scott, E. P. Sewell, J. B. Short, H. E. Staddon, G. B. Stanistreet, J. C. B. Statham, E. B. Steel, G. St. Thom, N. Tyacke, C. F. Wanhill, A. H. Waring, A. L. Webb, C. W. H. Whitestone, C. A. Young, B. F. Zimmermann.

Captains.—M. D. Ahern, R. B. Ainsworth, J. A. Balck, H. R. Bateman, R. B. Black, C. Bramhall, H. A. Bransbury, R. H. Bridges, C. G. Browne, J. H. Brunskill, H. St. M. Carter, J. T. Clapham, J. B. Clarke, J. M. M. Crawford, P. Davidson, D.S O., M. G. Dill, J. Dorgan, T. S. Dudding, P. G. Easton, T. Exton, P. Farrant, H. H. J. Fawcett, F. G. Fitzgerald, C. E. Fleming, E. M. Glanvill, M. F. Grant, A. R. Greenwood, A. E. Hamerton, D.S.O., J. B Hanafin, J. S. Harvey, P. H. Henderson, A. D. Jameson, J. C. Kennedy, L. N. Lloyd, D.S O., H. W. Long, R. H. MacNicol, J. St. A. Maughan, A. H. M. Mitchell, C. D. Myles, F. H. Noke, S. L. Pallant, F. M. Parry, R. L. Popham, G. A. H. K. Reed, W. Riach, J. D. Richmond, A. M. Rose, A. W. Sampey, A. A. Seeds, A. B. Smallman, H. Spackman, F. A. Stephens, R. Storrs, C. H. Straton, J. Tobin, N. D. Walker, W. J. Waters, A. J. Williamson, A. S. Williams, W. Wiley, H. C. Winckworth, A. E. B. Wood, W. A. Woodside, E. S. Worthington, M.V.O., T. J. Wright, C. J. Wyatt.

Lieutenants.—G. H. Dive, R. Gale, C. H. H. Harold, R. C. G. M. Kinkead, H. S. Ranken.

During dinner the following programme of music was performed by selected musicians from the Corps band, under the direction of Mr. G. P. Robertson, Bandmaster, R.A M.C.

PROGRAMME OF MUSIC.

1.	*Coronation March*		*Scotson Clark.*
2.	*Overture*	" Dichter und Bauer "	*Suppé.*
3.	*Selection*	" The Dollar Princess "	*Fall.*
4.	*Valse*	" Luxembourg "	*Lehar.*
5.	*Three Hungarian Dances*		*Brahms.*
6.	*Selection*	" The Chocolate Soldier "	*Strauss.*
7.	*Valse*	" Ravissante "	*Godin.*
8.	*Dance*	" In the Shadows "	*Finck.*
9.	*Habanera*	" Trocha "	*Tyres.*
10.	*Serenade de Mandolines*		*Desormes.*

" GOD SAVE THE KING."

The usual loyal toasts were honoured in the customary manner.

THE ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

FOUNDED BY SIR JAMES MCGRIGOR IN 1816.

President.—Surgeon-General W. L. Gubbins, C.B., M.V.O., M.B., K.H.S., Director-General.

Vice-Presidents.—Deputy Surgeon-General C. A. Innes, M.D., Deputy Surgeon-General W. G. Don, M.D., Surgeon-General W. S. M. Price.

Trustees.—Lieutenant-Colonel J. Martin, Lieutenant-Colonel J. Stevenson, M.D., Lieutenant-Colonel A. F. S. Clarke, M.D.

Committee for 1911-1912 —Major W. H. Horrocks (1909); Surgeon-General Sir O. MacD. Cuffe, K.C.B., Colonel D. Wardrop, C.V.O., Brevet-Lieutenant-Colonel Sir W. B. Leishman, Knt., F.R.S., Major C. E. Pollock (1910); Colonel R. W. Ford, D.S.O., Lieutenant-Colonel A. M. Davies, Lieutenant-Colonel M. W. Russell, Major T. W. Gibbard (1911).

Bankers.—Sir Charles R. McGrigor, Bart., and Co, 25, Charles Street, St. James's Square, S.W.

Auditors.—Messrs. Deloitte, Plender, Griffiths and Co., Chartered Accountants.

Consulting Actuary.—H. W. Andras, Esq., F.I.A.

Honorary Treasurer.—Sir James R. D. McGrigor, Bart.

Secretary.—Captain J. T. Clapham, 20, Belgrave Road, Westminster, S.W.

The Annual General Meeting, followed by a Special General Meeting of the above Society, was held in the Library of the Royal Army Medical College, Grosvenor Road, S.W., on Tuesday, May 30, at 3.30 p.m.

Present :

Surgeon-General W. L. Gubbins, C.B., M.V.O., K.H.S., Director-General, President, in the chair; Surgeon-General W. S. M. Price and Deputy Surgeon-General W. G. Don, Vice-Presidents; Surgeon-Generals Sir Charles Cuff, K.C.B., G. J. H. Evatt, and C. Hervé Giraud; Lieutenant-Colonels A. F. S. Clarke, Sir W. B. Leishman, F.R.S., and M. W. Russell; Majors W. H. Horrocks, T. W. Gibbard, and C. E. Pollock; Captain J. C. G. Carmichael.

(1) The notice in the *Times* convening the meeting was read.

(2) The Minutes of the previous Annual General Meeting, held on May 24, 1910, were read and confirmed.

(3) The death was recorded on May 10, 1911, of Colonel T. Ligertwood, C.B., K.L.H., for many years Secretary of the Society. A resolution of regret and sympathy was passed unanimously, which the Secretary was directed to convey to Colonel Ligertwood's family.

(4) The adoption of the Annual Report and Statement of Accounts for the year 1910 was moved from the chair, and carried unanimously.

(5) On the question of filling vacancies on the Committee, the Meeting recorded its high appreciation of the great services rendered to the Society for so many years by the retiring members. In view of the small proportion of active list officers on the Committee, the feeling was general that their number should be increased, especially with a view of bringing the advantages of membership of the Society to the notice of the younger officers on the active list. After the unanimous re-election of Lieutenant-Colonels A. M. Davies and M. W. Russell, the following were unanimously elected to fill the remaining vacancies on the Committee: Colonel R. W. Ford, D.S.O., and Major T. W. Gibbard.

(6) Messrs. Deloitte, Plender, Griffiths and Co., were appointed Auditors for the year 1911-1912.

SPECIAL GENERAL MEETING.

The Meeting was then constituted a Special General Meeting for the consideration of the Actuary's Quinquennial Valuation Report and recommendations as to appropriation of surplus; also of proposed amendments to Rules V and XXXV, recommended by the Committee.

(1) On the motion of the chair, it was then resolved unanimously "That the Actuary's Quinquennial Valuation Report be adopted; and that, in accordance with his advice contained therein, on the recommendation of the Committee, the sum of £8,815 be appropriated for division out of the present surplus, to provide :—

- (i) An addition of 4 per cent. to all annuity benefits, immediate or contingent, in respect of *members on the books on December* 31, 1910, which will bring the £50 annuity benefits up to the present statutory limit of £52 per annum.
- (ii) A sum of £100 to be paid at the death of every first-class married *member on the books at December* 31, 1910, should he pre-decease his present wife, and to be in addition to the sum then payable as the first half-yearly annuity payment.
- (iii) To the widow of each second-class married *member on the books at December* 31, 1910, a sum of £50 to be paid at the death of the member, should he pre-decease his present wife, and to be in addition to the sum then payable as the first half-yearly annuity payment.

(2) The following amendments to Rules V and XXXV, recommended by the Committee, were proposed from the chair, and carried unanimously :—

(*a*) Rule V, line 3, strike out the word "shall" and substitute "may."
Rule V, line 5, after the word "rule," add the following :—
"Except that on the imminence, or outbreak of war, the Committee is empowered to postpone consideration of the application for membership of any officer who is at the time on active service, or under orders for active service, or who, in the opinion of the Committee, is likely to be exposed to war risks in the near future. Or in the alternative, to accept him as a member on payment of such extra charge to cover war risks as the Com-

mittee, on the advice of the Actuary to the Society, may determine. The applications of officers who may have been commissioned since the outbreak of war, and have therefore had no previous opportunity of joining the Society, shall be specially considered by the Committee."

(*b*) Rule XXXV, line 7, after the words "National Debt," add the following:—

* "Or in any investment in which trustees are for the time being by law authorized to invest trust funds.

The business concluded with a vote of thanks to the Chairman, which was carried unanimously.

J. T. CLAPHAM, Captain,
Secretary.

REPORT OF THE COMMITTEE TO THE MEMBERS OF THE ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND FOR THE YEAR 1910.

The Committee have the honour to present to members the following Report of the Society, and to submit the accounts for the year ended December 31, 1910. They also submit the Actuary's Report on his quinquennial valuation of the assets and liabilities of the Fund, as at December 31, 1910.

In 1910, Surgeon-General W. L. Gubbins, C.B., Director-General, succeeded Surgeon-General Sir Alfred Keogh, K.C.B., as President of the Society. Surgeon-General W. S. M. Price was elected a Vice-President, and Lieutenant-Colonel A. F. S. Clarke, a Trustee. Vacancies on the Committee were filled by the election of Surgeon-General Sir Charles Cuffe, K.C.B., Colonel D. Wardrop, C.V.O., Lieutenant-Colonel Sir W. B. Leishman, F R.S., and Major C. E. Pollock.

During the past year eighteen officers have joined the Society, sixteen as married, and two as unmarried members. This is the largest accession of new members for many years past. One member has been transferred from the unmarried to married class; two have died, and one has resigned. Of annuitants two have died, and two widows have been placed on the list. Details will be found in the list of members and annuitants.

On December 31, 1910, there were 146 members of the Society, of whom sixteen were unmarried. Of these ninety were on the Active, and fifty-six on the Retired List. Of this total fifty-nine have joined the Society since the new rules came into force at the beginning of 1906. The annuitants numbered seventy-five. No orphan benefits have yet arisen.

During the year the only changes in the investments of the Fund have been as follows:—

The sums of £3,501 10s. 3d. on the old account, and of £676 15s. 2d. on the new account (being interest on the amounts already invested with them), have been invested with the Commissioners for the reduction of the National Debt. The sums of £1,200 on the old account, and of £750 on the new account, have been withdrawn from the National Debt Commissioners for the payment of annuities.

[The terms "old account" and "new account," used above, and in the balance sheet, refer to separate accounts, which have to be kept under these heads, for transactions with the National Debt Commissioners with regard to those members who joined the Society in different periods.]

It will be seen from the Statement of Accounts, that, this being the year in which the quinquennial valuation of the assets and liabilities of the Fund takes place, the book value of the securities has been adjusted to their market value at December 31, 1910; at which they are shown in the balance sheet, instead of at cost price as previously. This involves writing off £1,433 14s. 4d. as depreciation (see Benefit Fund). The principal loss has been on Midland Railway Stock (£1,284), and on Consols (£571). London and North Western Railway Debentures have appreciated (£486). Caledonian and East India Railway Stock have changed very little.

At the Special General Meeting last May, a change was authorized, with Counsel's advice, in Rule X, whereby surplus can now be applied for the benefit of widows and orphans of members. Without this change in the Rules the recommendations made by the Actuary in his Report would not have been possible.

Under the Finance Act, 1910, the Society now recovers income tax paid on dividends from its investments.

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* The additional clause recommended is taken, as it stands, from the Friendly Societies Act, 1896, 44 (1) (f). The law referred to is the Trustee Act, 1893, and the Colonial Stock Act, 1900.

ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

ACCOUNTS FOR THE YEAR 1910.

(In the form prescribed for the Annual Return of a Registered Friendly Society.)

(A) BENEFIT FUND.

DR. INCOME.	£	s.	d.
Contributions for Benefits—			
Subscriptions for Widows' and Orphans' Fund..	1,620	6	5
Marriage Fine	82	10	0
Interest on Investments of Benefit Funds (less Tax deducted, £34 18s. 8d.)	4,742	0	7
Income Tax recoverable for the year ended April 5, 1910	34	0	5
Donations from Officers R.A.M.C., Northern Command	2	1	0
Total Income	£6,480	18	5
Amount of Benefit Fund at the beginning of the year as per last Balance Sheet	128,934	18	8
	£135,415	17	1

EXPENDITURE. CR.	£	s.	d.
Widows' Annuities (after deducting Income Tax) ..	3,467	18	3
Income Tax on Annuities	213	5	5
Interest on £4,189 12s. 8d. (balance of Management Fund at the end of the year 1909) at 3 per cent., transferred to Management Fund	125	13	9
Amount of depreciation of market value of Securities. as at December 31, 1910, written off	1,433	14	4
Total Expenditure	£5,240	11	9
Amount of Benefit Fund at the end of the year as per Balance Sheet (C)	130,175	5	4
	£135,415	17	1

(B) MANAGEMENT FUND.

DR. INCOME.	£	s.	d.
Interest for one year on £4,189 12s. 8d. at 3 per cent.. transferred from Benefit Fund	125	13	9
Management Fund at the beginning of the year as per last Balance Sheet	4,189	12	8
	£4,315	6	5

EXPENDITURE. CR.	£	s.	d.
Secretary's Salary	150	0	0
,, Office Allowance	60	0	0
Actuary's Fee	21	0	0
Auditor's Fee	10	10	0
Counsel's and Solicitor's Fees	8	8	0
Expenses *re* Transfer of Stock to Names of New Trustees	16	4	0
Printing, Stationery, Postages, &c.	19	2	8
Reprint of Rules..	9	11	6
Hire of Theatre of R.U.S. Institution for Annual General Meeting	1	1	0
Total Expenditure..	£295	17	2
Amount of Management Fund at the end of the year as per Balance Sheet (C)	4,019	9	3
	£4,315	6	5

(C) BALANCE SHEET OF FUNDS AND EFFECTS, AS AT DECEMBER 31, 1910.

Dr. Liabilities.	£	s.	d.
Total Benefit Fund, as per Account (A)	130.175	5	4
Amount of Management Fund, as per Account (B)	4,019	9	3
Other Liabilities—			
Income Tax deducted from Annuities	213	5	5
Secretary's Salary and Office Allowance (from October 1 to December 31, 1910)	52	10	0
Actuary's Fee	21	0	0
Half Year's Annuity (since drawn)	25	0	0
	£134,506	10	0

Assets.				Rate per cent. of Interest yielded.			£	s.	d. Cr.
(1) With the Commissioners for the Reduction of the National Debt—									
Old Account, at 2½d. per cent. per diem				3	16	0½	93,916	14	5
New Account, at 2d. per cent. per diem				3	0	10	22,083	13	6
(2) In the Public Funds—									
Two and a Half per Cent Consols	£4.917	18	10	3	3	1	3,897	9	3
(3) Other Securities—									
London and North-Western Railway Three per Cent. Debenture Stock	5,000	0	0	3	10	7	4,250	0	0
Caledonian Railway Four per cent. Debenture Stock	1,449	0	0	3	14	9	1,550	8	7
Midland Railway Two and a Half per Cent. Debenture Stock ..	7,827	5	7	3	12	6	5,400	16	5
East India Railway Three and a Half per Cent. Debenture Stock ..	2,060	0	0	3	14	6	1,936	8	0
Note—The above Securities are taken at market value on December 31, 1910.									
Income Tax recoverable for the year ended April 5, 1910							34	0	5
Subscription outstanding (since paid)							15	7	3
Cash at Bankers							1,421	12	2
							£134,506	10	0

To the Members of the Army Medical Officers' Widows' and Orphans' Fund.

We have examined the above Balance Sheet and Accounts with the Books and Vouchers of the Society and certify that it is in accordance therewith. The Securities, and Cash Balances, have been verified by us.

5, London Wall Buildings,
Finsbury Circus, London, E.C.
March 25, 1911.

DELOITTE, PLENDER, GRIFFITHS & CO., *Auditors.*
Chartered Accountants.

Arrangements have been made with the Board of Inland Revenue whereby annuities will be paid in full without deduction of income tax; annuitants whose incomes exceed the limit to which exemption is allowed being assessed locally. It is hoped that many ladies will thus be spared inconvenience in recovering this tax.

The Committee are prepared in the event of the death of a member stationed abroad (which is verified at the War Office), to forward the sum due to the widow by telegraph should she so request, any extra expense being borne by her.

Great care should be taken by applicant to forward correct name and address, and also the name of bank to which it is desired that payment be made.

The Committee regard with much pleasure the eminently satisfactory financial position of the Fund, as shown by the Actuary's Report, and hope that the increase in benefits recommended will meet with general approval, and tend to a still greater appreciation of the advantages of the Society by officers of the Corps.

W. L Gubbins, *Director-General,*
President,
Chairman of the Meeting of this date.

War Office,
May 9, 1911.

REPORT OF THE ANNUAL MEETING OF THE ROYAL ARMY MEDICAL CORPS FUND.

The Ninth Annual Meeting of the Royal Army Medical Corps Fund was held at the Royal Army Medical College on Monday, June 12, 1911, at 2 p.m. Surgeon-General W. L. Gubbins, C B., M.V.O., K.H.S., Director-General A.M.S. presiding.

The Chairman, in opening the proceedings, said "The Committee, as you know, undertakes with the assistance of sub-Committees, the management and administration of various funds, these were fully explained at last year's general meeting, so that I need not go over old ground. Since our last meeting Colonel Wardrop has retired, and Major Spencer has been transferred to York. They have been replaced on the Committee by Colonel Risk and Major Pilcher. It was also considered advisable for various reasons to have the Band President on the Committee, and in order not to increase the number of members (viz., thirteen, nine full pay, and four retired pay officers) it was arranged that the Band President should be ex-officio a member of the Committee, instead of the P.M.O. Aldershot.

"The accounts of the Fund are now published annually, and will be found in the Corps news of February for each year. The finances on June 1 this year stood as follows:—

	£	s.	d.
R.A.M.C. Fund	£2,903	7	11
General Relief Fund	558	15	10
School Fund	660	17	8
Total	£4,123	1	5

being an increase of £667 on last year.

"Of this amount £2,800 stands on deposit, viz., £2,000 for the Royal Army Medical Corps Fund, £200 for the General Relief Fund, and £600 for the Charitable School Fund. Besides the above, the General Relief Fund has £1,100 invested by trustees in funds. As regards subscribers, 1,129 subscribed for 1910 as against 1,119 for 1909, a slight increase.

"As you are all aware, owing to the lamented death of King Edward VII no dinner was held last year. The dinner sub-committee for the current year is composed as follows:—

Colonel A. Peterkin (President), Brevet-Lieutenant-Colonel A. P. Blenkinsop, Major H. A. Bray, Major C. B. Martin, Captain F. S. Irvine. *Retired Officers:* Deputy Surgeon-General W. G. Don, Colonel Sir J. R. A. Clark, Bart., Lieutenant-Colonel E. M. Wilson, Major Birrell (Hon. Secretary).

During 1910 £329 was voted towards the band expenses.

A grant of £50 was made to the General Relief Fund, and the following amounts were paid for memorials, &c.:—

Preparing ground for McGrigor statue	£50	10	0
Removal of the Wolseley Memorial to Netley	2	19	1
Wreath for His late Majesty	15	0	0
Wreath for the late Miss Florence Nightingale	5	12	6

"With few exceptions all the companies sent grants for the General Relief Fund last year, amounting to £333 13s. 10d. The usual subscriptions to various bodies were forwarded, and in this connexion I might mention that we have sixty-eight men employed in the Corps of Commissionaires, which is a very high percentage compared with other branches of the Army. In addition, £211 12s. 0d. was expended in making grants to applicants in distressed circumstances. During the year Sir Alfred Keogh retired from the trusteeship of this Fund and Surgeon-General W. Donovan consented to act in his place.

"With reference to the School Funds, during the year £146 14s. 8d. was expended in maintaining and assisting children (orphans) in schools and homes. We are now assisting to educate ten children. The Fund, having no income, will eventually be expended, when its expenses will have to be borne by the General Relief Fund; at present £660 remains of the original £1,500.

"In January last a Sub-Committee of three members representing the Royal Army Medical Corps Fund, the Widows' and Orphans' Fund, and Army Medical Officers' Benevolent Society respectively, was appointed to consider the advisability of combining the Secretarial duties of all three bodies. The Sub-Committee reported that they were of opinion that the duties of all three Funds could be conducted by one Secretary who could give his whole time to the duties, and considered that such a combination would be both advantageous and economical, and would entail a net annual saving of £72. The Sub-Committee therefore recommended that as the Secretary of the Widows' Fund was appointed for five years from May, 1909, he should, with the consent of the Widows' Fund, take over the additional duties of the Royal Army Medical Corps Fund and Benevolent Society (the present post being a conjoint one). The Committee of the Benevolent Society resolved that the present conjoint Secretary, should be offered re-election for a term of three years at a conjoint salary of £180, to be divided equally between the two Funds and to include salary, clerical assistance, and office rent. At a special meeting of the Royal Army Medical Corps Fund Committee this resolution of the Benevolent Society Committee was considered and adopted, but they were of opinion that at some future time, when an opportunity occurred, the matter should be again considered. I might here remark that owing to St. George's Barracks having been handed over to the Trustees of the National Gallery an office has now to be provided and paid for."

Lt.-Colonel E. M. Wilson proposed that there should be a grant of £50 from the Royal Army Medical Corps Fund to the General Relief Fund—being the same amount as was voted last year. Colonel Wilson pointed out that this matter was raised some years ago when it was decided to make a grant of £10, but as the Fund was getting short of money it was raised to £50, and he trusted that the same amount would be given this year. Money was being spent at the rate of £160 per annum for the education of children, and the money which they had in hand would be gone in four years' time, unless the contributions from the regimental institutes and canteens were increased. This was seconded by Lieutenant-Colonel Maher and carried unanimously.

This concluded the business of the Royal Army Medical Corps Fund.

On the same date a special general meeting (the Director-General being in the chair) was held to consider the question of a subscription from all officers on the active list to the Royal Army Medical Corps Mess, London.

It will be remembered that at the conclusion of the meeting of the Corps Fund held in June, 1910, a Committee was appointed to advise on the question of a general contribution from the officers of the Corps to the Royal Army Medical Corps Mess, London. The Committee met on July 22, 1910, the members being Colonel D. Wardrop, C.V.O. (Chairman), Major D. Lawson (Netley), Major T. W. Gibbard (India), Major G. T. Rawnsley (Aldershot), Lieutenant-Colonel G. T. Blackwell (Woolwich), and Lieutenant-Colonel Blenkinsop (Secretary), and unanimously recommended:—

(1) That an annual subscription should be made by all officers of the Royal Army Medical Corps—not members of other established Royal Army Medical Corps Messes—

to the Royal Army Medical Corps Mess Fund for maintenance and the formation of a Royal Army Medical Corps Mess Reserve Fund.

(2) That in the event of other established Royal Army Medical Corps Messes requiring a grant in aid, the Headquarters Mess be empowered to make the same, if funds are available.

The Chairman thought that the first thing to decide was whether the Mess was to be considered as one representing the entire Corps, or to be a local institution pertaining to London only; he therefore invited a definite pronouncement on the subject. After considerable discussion it was unanimously resolved that the Royal Army Medical Corps Mess in London should be considered as *the* representative Mess of the entire Corps, and occupy the same position as the Royal Artillery and Royal Engineer Messes in connection with their Corps at Woolwich and Chatham respectively.

It was next proposed by Major Begbie, and seconded by Lieutenant-Colonel Maher, that an annual subscription be paid by all officers of the Royal Army Medical Corps on the active list, not members of established Messes, to a General Royal Army Medical Corps Mess Fund for the formation and maintenance of the Royal Army Medical Corps Messes at home and abroad. This was carried unanimously.

In order to give effect to the foregoing resolution the following officers were appointed members of a Committee to thrash out details. Colonel E. J. E. Risk (Chairman), Lieutenant-Colonels J. Maher and W. T. Swan, Majors J. C. Jameson and D. J. Collins, Captains L. Cotterill and C. D. Myles, with Lieutenant-Colonel A. P. Blenkinsop as Secretary.

It was also resolved that in order to avoid delay the recommendations of the Committee should be given effect to as soon as possible.

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

PROCEEDINGS of the Annual General Meeting held in the theatre of the Royal Army Medical College, London, S.W., on Monday, June 12, 1911, at 3 p.m.

Surgeon-General W. L. Gubbins, C.B., M.V.O., President, in the chair.

(1) The Minutes of the last General Meeting were read and confirmed.

(2) The following report of the Committee for the year 1910 was adopted:—

REPORT OF THE COMMITTEE FOR THE YEAR 1910.

The number of subscribers for the year was 175.

The receipts of the year amounted to £1,003 9s. 6d., and the expenditure to £860 18s 9d.

Grants were made to twenty-seven applicants representing thirty-nine orphans.

A legacy of £100 was received from the estate of the late Surgeon-General Sir J. Mouat, V.C.

£128 3s. 9d. consols at 81⅛ were purchased at an expenditure of £105 3s. 9d.

The statement of accounts for 1910 was passed.

(3) The following subscribers were elected Vice-Presidents for the ensuing year: Surgeon General W. Donovan, C.B.; Colonel J. Lane Notter; Colonel Sir James Clark, C.B., Bart.

(4) The following were appointed on the Committee for the ensuing year: Colonel A. Peterkin; Lieutenant-Colonel H. E. R. James; Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.; Major E. T. F. Birrell. Major W. H. Horrocks; Colonel E. J. E. Risk; Major E. M. Pilcher, D.S.O.

(5) The Meeting approved of the following list of applicants recommended for grants by the Committee:—

Three daughters of the late Staff-Surgeon D. O. D.	£30	0	0
Daughter of the late Inspector-General R. D.	30	0	0
Son of the late Surgeon-Major C. Q.	30	0	0
Son of the late Colonel R. W. T. and	30	0	0
McGrigor's pension	10	0	0
Son of the late Brigade-Surgeon M. Q.	30	0	0
Daughter of the late Surgeon-General J. F.	25	0	0
Daughter of the late Inspector-General D. A.	30	0	0
Two orphans of the late Lieutenant-Colonel H. W. A. M. ..	30	0	0
Three daughters of the late Captain W. J. C.	40	0	0

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

STATEMENT OF ACCOUNTS FOR THE YEAR 1910.

RECEIPTS.	£	s.	d.
To Balance in hand, January 1, 1910	340	17	10
,, Subscriptions	192	1	0
,, Dividends, 3 % Debenture Stock L. & N.W. Railway (*less* tax £11 13s. 4d.)..	188	6	10
,, Dividends, 3 % Debenture Stock N.E. Railway (*less* tax £11 13s. 4d.)	188	6	4
,, Dividends, 2½ % Debenture Stock Midland Railway (*less* tax £9 6s. 8d.)	150	13	4
,, Dividends, 4 % Debenture Stock Caledonian Railway (*less* tax £69 9s. 8d.)	104	14	4
,, Dividends on £890 17s. 0d. Consols	18	14	2
,, Legacy from Surgeon-General Sir J. Mouat, V.C., with interest	101	8	0
,, Rebate on Income Tax	59	5	6
	£1,344	7	4

EXPENDITURE.	£	s.	d.
By Donations..	671	0	0
,, Secretary's Salary, September 30, 1909, to December 31, 1910..	53	2	6
,, Allowance	26	0	0
,, Auditor	1	1	0
,, Bankers' Charges	0	5	3
,, Printing	0	15	3
,, Postage	1	14	7
,, Stationery	1	12	2
,, Purchase of Consols	105	8	0
,, Balance in Bank December 31, 1910..	483	8	7
	£1,344	7	4

SECURITIES.	£	s.	d.
3 % Debenture Stock L. & N.W. Railway	6,667	0	0
3 % ,, ,, N. Eastern ,, ...	6,666	0	0
2½ % ,, ,, Midland ,, ...	6,400	0	0
4 % ,, ,, Caledonian ,, ...	2,280	0	0
Consols	890	17	0
	£22,903	17	0

We have compared the above statement with the books and papers relating thereto, and certify that it is correct. We have verified the Bank balance and the Investment in Consols, and have inspected the Certificates of the Investments in Railway Stocks as set out.

Portland House,
Basinghall Street, E.C.
January 12, 1911.

(*Signed*) EVANS, PIERSON & CO.
Chartered Accountants.

Daughter of the late Surgeon-General A. S.	£10	0	0
Daughter of the late Lieutenant-Colonel H. T. C.	25	0	0
Daughter of the late Surgeon-General J. O.	30	0	0
Daughter of the late Deputy-Inspector-General F. T. I.	30	0	0
Two orphans of the late Surgeon-Major W. P. F.	40	0	0
Daughter of the late Surgeon-General T. B.	25	0	0
Daughter of the late Surgeon-Major B. S.	25	0	0
Daughter of the late Captain H. H. S.	20	0	0
Daughter of the late J. W. C.	20	0	0
Son of the late Brigade-Surgeon J. W. H.	30	0	0
Son of the late Major P. G. I.	30	0	0
Three orphans of the late Captain G. C.	30	0	0
Daughter of the late Surgeon W. P. O'R.	30	0	0
	£630	0	0

Twenty-two applicants representing thirty orphans.

Surgeon-General Sinclair having called attention to the fact that the income of the Society exceeded the expenditure, the Chairman pointed out that by Rule 4, £30 was the maximum grant allowed except under very special circumstances, Surgeon-General Sinclair proposed that Rule 4 should be altered to read £40 instead of £30 in the last line but one of the Rule; this was seconded by Lieutenant-Colonel E. M. Wilson, put to the vote, and carried unanimously.

(6) The Chairman stated that the present conjoint Secretary's tenure of appointment expired at the end of last year, but he consented, at the request of the Committee, to continue in office until after this General Meeting; in the meantime, in January last, a Sub-Committee of the Royal Army Medical Corps Fund and Army Medical Officers' Benevolent Society was appointed to consider the advisability of combining the secretarial duties of these Funds with those of the Army Medical Officers' Widows' Fund.

The Sub-Committee reported that they were of opinion that the duties of all three Funds could be conducted by a Secretary who could give his whole time to the duties, and considered that such a combination would be both advantageous and economical, the Sub-Committee therefore recommended that as the Secretary of the Widows' Fund was appointed for five years from May, 1909, he should, with the consent of the Widows' Fund, take over the additional duties of the Royal Army Medical Corps Fund and Benevolent Society. This recommendation was approved of by the Committee of the Royal Army Medical Corps Fund, but not by the Committee of the Benevolent Society (the present post being a conjoint one) The Benevolent Society resolved that the present conjoint Secretary should be offered re-election for a term of three years at a conjoint salary of £180, to be divided equally between the two Funds, and to include his remuneration, clerical assistance, and office rent.

At a special meeting of the Royal Army Medical Corps Fund Committee this resolution of the Benevolent Society was considered, and was also adopted, but they were of opinion that at some future time, when an opportunity occurred, the matter should again be considered.

After some discussion it was resolved "That the present Secretary should be re-elected for three years from 1st prox. on the terms recommended by the Committee."

This ended the proceedings.

F. H. Davie Harris, *Lieutenant-Colonel,*
Secretary.

June 12, 1911.

LIST OF SUBSCRIBERS TO THE BENEVOLENT FUND FOR THE YEAR 1910.

Subscriptions—£2 2 0: Deputy Surgeon-General E. M. Sinclair and Colonel J. H. C. Whipple.

" £2 0 0: Miss Allan, Mrs. J. H. C. Hayes, Lieutenant-Colonel J. Maher, and Major J. T. M. Symons.

" £1 1 0: Major J. D. Alexander, Captain W. G. Aviss, Lieutenant-Colonel J. F. Brodie, Major J. M. Buist, Lieutenant-Colonel J. Battersby, Major T. B. Beach. Surgeon-General G. D. Bourke, C B., Captain C. A. J. A. Balch, Major F. W. Begbie, Captain W. W. Brown, Captain L. Bousfield,

Subscriptions—£1 1 0: Captain J. E. M. Boyd, Lieutenant-Colonel A. F. S. Clarke, Major J. H. Campbell, D.S.O., Lieutenant-A. B. Cottell, Major S. L. Cummins, Captain F. W. Cotton, Captain A. Chopping, Captain G. B. F. Churchill, Major E. W. W. Cochrane, Lieutenant-Colonel G. Cree, Surgeon-General Sir Chas. Cuffe, K.C.B., Captain J. T. Clapham, Major J. C. Connor, Major R. J. Copeland, Captain F. H. M. Chapman, Colonel Sir James Clarke, C.B., Bart., Captain V. T. Carruthers, Captain F. Casement, Lieutenant-Colonel A. M. Davis, Colonel J. R. Dodd, Surgeon-General W. Donovan, C.B., Major P. Evans, Surgeon-General P. M. Ellis, Captain A. C. Elliot, Major A. A. Fitzgerald, Lieutenant-Colonel R. H. Firth, Captain F. M. Foulds, Lieutenant-Colonel J. R. Forrest, Lieutenant-Colonel H. J. Fletcher, Lieutenant-Colonel R. J. Fayle, Surgeon-Major-General H. C. Giraud, Major J. Girvin, Lieutenant-Colonel J. S. Green, Colonel J. R. Geddes, Captain R. W. Galway, Captain H. G. Gibson, Surgeon-General W. L. Gubbins, C.B., M.V.O., Major W. E. Hardy, Lieutenant-Colonel R. H. Hall, Major E. M. Hassard, Captain G. W. G. Hughes, Lieutenant-Colonel R. Holyoake, Major W. H. Horrocks, Lieutenant-Colonel F. W. H. D. Harris, Captain J. E. Hodgson, Colonel J. G. Harwood, Lieutenant-Colonel J. M. Irwin, Deputy Surgeon-General C. A. Innes, Colonel W. Johnston, C.B., Colonel H. E. R. James, Major R. W. H. Jackson, Lieutenant-Colonel F. W. C. Jones, Lieutenant-Colonel R. Kirkpatrick, M.D., C.M.G., Surgeon-General Sir A. Keogh, M.D., K.C.B., Surgeon-General W. W. Kenny, Captain W. D. C. Kelly, Lady Longmore, Lieutenant-Colonel W. L. Lane, Colonel G. D. N. Leake, Captain P. S. Lelean, Captain W. H. Long, Captain W. E. C. Lunn, Captain J. du P. Langrishe, Captain W. F. M. Loughnan, Colonel T. W. Martin, Captain A. M. MacLaughlin, Colonel W. G. Macpherson, C.M.G., Colonel W. H. Murray, Lieutenant-Colonel H. S. McGill, Colonel W. A. May, C.B., Surgeon-General W. H. McNamara, C.B., C.M.G., Major E. McSheehy, Major A. J. McDougall, Major T. C. MacKenzie, D.S.O., Major G. S. MacLoughlin, D.S.O., Lieutenant-Colonel C. W. S. Magrath, Major C. B. Martin, Colonel H. J. R. Moberley, Captain A. H. Morris, Captain O. R. McEwen, Colonel C. G. Mosse, Captain C. D. Myles, Colonel J. G. MacNeece, Captain G. S. Nickerson, Captain F. H. Noke, Major C. E. Pollock, Major F. J. W. Porter, D.S.O., Major C. W. Profeit, Captain J. E. Powell, Colonel R. Porter, Major I. Paterson, Colonel A. Peterkin, Lieutenant-Colonel E. J. E. Risk, Lieutenant-Colonel H. D. Rowan, Surgeon-General S. B. Roe, C.B., Lieutenant-Colonel M. W. Russell, Captain G. F. Rugg, Captain F. E. R. Robinson, Major A. E. Smithson, Colonel C. Seymour, Captain E. P. Sewell, Lieutenant-Colonel B. Skinner, M.V.O., Lieutenant Colonel A. A. Sutton, D.S.O., Major C. G. Spencer, Major H. E. Staddon, Major E. B. Steel, Captain F. A. Stephens, Major M. Swabey, Major S. Boylan Smith, Major C. E. G. Stalkartt, Captain J. A. B. Sim, Surgeon-General F. W. Trevor, C.B., Surgeon General Sir E. Townsend, K.C.B., Lieut.-Colonel C. J. W. Tatham, Lieutenant-Colonel H. O. Trevor, Captain W. I. Thompson, Colonel D. Wardrop, C.V.O., Lieutenant-Colonel J. G. Williamson, Lieutenant-Colonel T. P. Woodhouse, Surgeon-General J. A. Woolfreyes, K.C.B., C.M.G., Surgeon-General H. R. Whitehead, C.B., Captain A. D. Waring, Major B. Watts, Subscriptions—£1 1 0: Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O., Captain M. G. Winder, and Major A. H. O. Young.

,, £1 0 0: Surgeon-General W. Babtie, V.C., C.M.G., Major E. T. F. Birrell, Lieutenant-Colonel J. Battersby, Surgeon-General J. S. Comyn, Colonel T. M. Corker, Surgeon-General A. F. Churchill, Lieutenant-Colonel H. E. Cree, Major A. J. Chambers, Mrs A. E. Davidson, Surgeon-General J. C. H. Evatt, C.B., Lieutenant-Colonel H. P. Elkington, Lieutenant-Colonel J. J. Gerrard, Colonel G. J. Goggin, Captain J. E. H. Gatt, Colonel R. J. D. Hackett, Lieutenant-Colonel T. W. O'H. Hamilton, C.M.G., M.B., Colonel R. M. D. Jennings, Major J. C. Jameson, Lieutenant-Colonel M. Knox, Major J. Moir, Major W. T. Mould, Captain C. D. Myles, Captain D. F. Mackenzie, Colonel J. L. Notter, Lieutenant-Colonel G. F. Poynder, Major H. I. Pocock, Lieutenant-Colonel C. C. Reilly, Surgeon-General A. Sloggett, C.B., C.M.G., Major H. C. F. Stallard, and Lieutenant-Colonel R. J. Windle.

,, £0 10 6: Major S. A. Archer and Captain A. E. Hamerton, D.S.O.

UNITED SERVICES MEDICAL SOCIETY.

THE Annual General Meeting of the above Society will be held at 5 p.m. on Wednesday, July 12, 1911. at the Royal Army Medical College.

J. LAWRENCE SMITH, *Fleet Surgeon, R.N.*
W. S. HARRISON, *Major, R.A.M.C.* } *Hon. Secretaries.*

NOTICE—FOUND.

THE Mess uniform of a Lieutenant-Colonel, Royal Army Medical Corps, has been found by an Officer of the Devons amongst his baggage after his return from India. The owner is requested to apply to the Officer in Charge, Military Hospital, Tidworth.

BIRTHS.

SUTCLIFF.—On June 12, at Platte Saline House, Alderney, Channel Isles, the wife of Captain Archibald A. Sutcliff, R.A.M.C., of a son.

GIBSON.—On May 10, at Mussoorie, to Captain and Mrs. H. Gibson, R.A.M.C., a daughter.

STONEY-ARCHER.—On June 2, at Maymgo, Burmah, to Major and Mrs. Stoney-Archer, a daughter.

STEELE.—On June 4, at Tidworth, Wilts, the wife of Captain W. L. Steele, R.A.M.C., of a daughter.

McKENZIE.—On June 20, at Holmwood, Brookwood, Surrey, to Captain and Mrs. J. McKenzie, R.A.M.C., a son.

MARRIAGE.

HART—McNEIL.—On April 8, at Christ Church, Rangoon, by the Rev. Cowper Johnson, Captain Henry Percival Hart, R.A.M.C., second son of William Edward Hart, of Kilderry, co. Donegal, to Nelly Reddie, second daughter of the Rev. Charles McNeil, late of St. George's Church, Dumfries.

DEATHS.

ELKINGTON.—At Farnborough, on May 31, 1911, Honorary Deputy-Surgeon-General Arthur Guy Elkington, retired, late Brigade of Guards, aged 78. He entered the Service as an Assistant Surgeon (Staff) on March 11, 1853; transferred to Scots Fusilier Guards, February 17, 1854; became Surgeon, Grenadier Guards, October 30, 1866; Surgeon-Major, January 4, 1871; Brigade-Surgeon of the Brigade of Foot Guards, February 2, 1881: and retired on retired pay with the honorary rank of Deputy-Surgeon-General, November 5, 1887. His war service was: Crimean Campaign, 1854 55: Battles of Inkerman (wounded), Balaklava; Siege and fall of Sevastopol. Mentioned in Despatches. Medal with 3 clasps; Turkish medal; 5th class of Medjidie.

OSBORNE.—At North End, Portsmouth, on June 9, 1911, Quartermaster and Honorary Major Robert Toler Osborne, retired, late Army Medical Staff. He joined the Service in the 83rd Regiment on August 22, 1862; was granted a Commission as Lieutenant of Orderlies, Army Hospital Corps, on June 25, 1873; became Captain of Orderlies on August 7, 1875; Quartermaster and Honorary Captain, November 18, 1882; Honorary Major, May 7, 1890; and was placed on retired pay August 21, 1898. His war service was. Egyptian Expedition, 1882: Battle of Tel-el-Kebir (mentioned in Despatches), Medal with clasp, bronze star; granted honorary rank of Captain. Soudan Expedition, 1884-85: Nile, clasp; Operations on the Nile, 1889; granted honorary rank of Major.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, *Serle Street, London, W.C., not later than the* 22*nd of the month.*

THE OFFICERS' EXCHANGE AND AGENCY CO., LTD.,
92, VICTORIA STREET, S.W.,
Have several excellent exchanges for Officers of all ranks under orders, who wish to remain at home. Apply Secretary.

A Senior Major, with probably two and a half more years at home, will exchange with a Major in India who has about the same time to complete. Address, E. A. B., c/o Messrs. Holt & Co., 3, Whitehall Place, S.W.

Serjeant, R.A.M.C., Egypt, wishes exchange to England (family affairs). Two years to complete tour. Apply, Serjeant H., R.A.M.C., Military Hospital, Cairo.

Wanted by Captain, R.A.M.C., due for abroad next Trooping Season, an exchange to remain at home. Apply, "W. N. R.," c/o Messrs. Holt and Co., 3, Whitehall Place, S.W.

A free issue of twenty-five excerpts will be made to contributors of all articles classified under the heading of Original Communications, Lectures, Travels, and Proceedings of the United Services Medical Society.

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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Captain C. H. Straton, Major F. J. W. Porter, Major J. W. H. Houghton, Major R. J. Blackham, Surgeon-Major W. R. C. Middleton, Major W. R. Blackwell, Major W. S. Harrison, Quartermaster-Serjeant F. Davis, Captain J. H. Barbour, Colonel T. P. Woodhouse, Lieutenant-Colonel C. Birt, Captain P. S. Lelean, Colonel Sir David Bruce, Major F. A. Symons, Captain A. G. McKendrick, I.M.S., G. A. Stephens, M.D., Major F. J. Palmer, Major A. Weld, Major C. F. Wanhill.

The following publications have been received:—

British: Army and Navy Gazette, St. Thomas' Hospital Gazette, The Australasian Medical Gazette, Guy's Hospital Gazette, Public Health, Red Cross and Ambulance News, The Commonwealth Military Journal, The Medical Review, The Lancet. St. Bartholomew's Hospital Journal, The Royal Engineers' Journal, Journal of the Royal Sanitary Institute, The Hospital, Medical Press and Circular, The Practitioner. The Shield, The Journal of Tropical Medicine and Hygiene, Annals of Tropical Medicine and Parasitology, Proceedings of the Royal Society of Medicine, Journal of the Royal Institute of Public Health, The Public Health Journal (Canadian), The Indian Medical Gazette, The Army Service Corps Journal, The Malay Medical Journal

Foreign: Russian Naval Medical Journal, Rivista de Sanidad Militar, The Military Surgeon, Archiv. für Schiffs- und Tropen-Hygiene, Le Caducée, Archives de Médecine et Pharmacie Navales, Bulletin de l'Institut Pasteur, Archives de Médecine et de Pharmacie Militaires, Tidskrift i Militär Hälsovard, Giornale di Medicina Militare, Japanese Medical Journal American Medicine, United States Department of Agriculture.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

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THE HON. MANAGER,
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WAR OFFICE, WHITEHALL, S.W.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

August, 1911.

ARMY MEDICAL SERVICE.

Lieutenant-Colonel Francis H. Treherne, from the Royal Army Medical Corps, to be Colonel, *vice* F. B. Maclean, retired, dated June 17, 1911.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel John Battersby, M.B., half-pay list, is placed on retired pay, dated May 19, 1911. Lieutenant-Colonel Battersby entered the Service as a Surgeon, Army Medical Department, on February 5, 1881; became Surgeon-Major, Army Medical Staff, February 5, 1893, Lieutenant-Colonel, Royal Army Medical Corps, February 5, 1901; Lieutenant-Colonel with increased pay (under Article 317 Royal Warrant) on July 4, 1906, and was placed temporarily on the half-pay list on account of ill-health on October 2, 1910. His war service is: Egyptian Expedition, 1882; Battle of Tel-el-Kebir, medal with clasp, bronze star. Operations in Chitral, 1895, medal with clasp. Nile Expedition, 1898. Battle of Khartoum, Egyptian medal with clasp, medal.

Lieutenant-Colonel James R. Forrest retires on retired pay, dated June 21, 1911. Lieutenant Colonel Forrest entered the Service as a Surgeon, Army Medical Staff, on January 31, 1885; became Surgeon-Major, Army Medical Staff, January 31, 1897, and Lieutenant-Colonel Royal Army Medical Corps, on January 31, 1905. His war service is: Soudan Expedition, 1885; Suakin, medal with clasp, bronze star. North-west Frontier of India, 1897-8, with Tirah Expedition Force, medal with two clasps.

Lieutenant-Colonel Henry L. E. White is placed on retired pay, dated July 3, 1911. Lieutenant-Colonel White entered the Service on March 6, 1880, as a Surgeon, Army Medical Department, became Surgeon-Major, Army Medical Staff on March 6th, 1892, and Lieutenant-Colonel Royal Army Medical Corps, March 6, 1900. His war service is: Operations in Chitral, 1895, with the Relief Force, medal with clasp.

The undermentioned Majors to be Lieutenant-Colonels: Frederick J Morgan, *vice* F. J. Jencken, promoted, dated May 12, 1911; William H. Horrocks, M.B., *vice* R. P. Bond, retired, dated May 19, 1911; Charles H. Hale, D S.O., *vice* W. B. Thomson, retired, dated June 7, 1911; Hugh C. Thurston, C.M.G., *vice* F. H. Treherne, C.M.G., promoted, dated June 13, 1911.

The undermentioned Officers, from the seconded list, are restored to the establishment: Captain Geoffrey W. G. Hughes, dated June 16, 1911: Lieutenant John S. Levack, M.B., dated May 26, 1911.

Royal Army Medical Corps, Quartermaster and Honorary Major George Merritt is placed on retired pay, dated June 23, 1911.

MEMORANDA.—Lieutenant-Colonel William H. Horrocks, M.B., Royal Army Medical Corps, to be Brevet-Colonel, dated May 20, 1911.

Serjeant-Major William Townley Spencer to be Quartermaster, with the honorary rank of Lieutenant, dated June 24, 1911.

The King has been pleased to give Major Frederick Fitzgerald Carroll, Royal Army Medical Corps, His Majesty's Royal licence and authority to accept and wear the Imperial Ottoman Order of the Osmanieh, Fourth Class, which has been conferred on him by His Highness the Khedive of Egypt, authorized by His Imperial Majesty the Sultan of Turkey, in recognition of valuable services rendered by him.

CORONATION HONOURS.

The King has been graciously pleased, on the occasion of His Majesty's Coronation, to give orders for the following promotions in, and appointments to, the Most Honourable Order of the Bath: –

To be an Additional Member of the Military Division of the Second Class or Knight Commander: Surgeon-General William Launcelotte Gubbins, C.B., K.V.O., K.H.S., Director-General, Army Medical Service.

To be Ordinary Members of the Military Division of the Third Class, or Companions: Surgeon-General James Gaussen MacNeece, Principal Medical Officer, 8th (Lucknow) Division, India. Surgeon-General George Winsor Robinson, Principal Medical Officer, Aldershot Command.

To be Additional Members of the Civil Division of the Third Class, or Companions: Lieutenant-Colonel Herbert Ellison Rhodes James, F.R.C.S., Royal Army Medical Corps (Retired), Attached General Staff, War Office.

Colonel Peter Broome Giles, Administrative Medical Officer, 1st London Division.

Colonel George Sampson Elliston, Administrative Medical Officer, East Anglian Division.

His Majesty the King has been graciously pleased to approve of. —

Colonel John Raglan Thomas, M.D., of the Army Medical Service of the Territorial Force, Administrative Medical Officer of the Wessex Territorial Division, being appointed an Honorary Physician to His Majesty for His Majesty's Territorial Force; and of

Colonel Damer Harrison, F.R.C.S.(Edin.), of the Army Medical Service of the Territorial Force, Administrative Medical Officer of the West Lancashire Territorial Division, being appointed an Honorary Surgeon to His Majesty for His Majesty's Territorial Force.

ARRIVALS HOME ON LEAVE.—Colonel T. M. Corker; Lieutenant-Colonel L. T. M. Nash: Majors C. W. H. Whitestone, E. M. Morphew, and E. W. P. V. Marriott; Captains E. W. Siberry, R. G. Anderson, and J. H. Graham; Lieutenants M. Leckie and A. E. G. Fraser.

POSTINGS.—Major L. P. More from India to Southern Command.

Eastern.

Captain A. E. B. Wood.
,, J. B. Meldon.
,, J. M. M. Crawford.
,, C. Bramhall.
,, T. S. Dudding.
,, R. H. MacNicol.
,, W. Wiley.
,, M. D. Ahern.
,, C. J. Wyatt.

Southern.

Major F. J. Brakenridge.
Captain R. L. V. Foster.
,, S. M. W. Meadows.
,, R. H. Bridges.
,, R. C. Wilmot.
,, H. H. J. Fawcett.
,, S. M. Pallant.
,, C. R. Sylvester-Bradley.
,, S. E. Lewis.
,, R. B. Hole.
,, R. J. B. Buchanan.
,, P. Farrant.

Western.

Captain J. G. Bell.
,, J. C. G. Carmichael.
,, F. C. Lambert.

London District

Captain A. J. Hull.

Northern.

Captain B. G. Patch.
,, E. M. Glanvill.
,, H. Harding.

Irish.

Captain J. H. Brunskill.
,, J. A. W. Webster.
,, H. B. Kelly.
,, E. M. Pennefather.
,, B. H. V. Dunbar.
,, H. T. Stack.
,, A. C. H. Gray.
,, P. J. Hanafin.
,, H. H. A. Emerson.

Aldershot.

Captain P. Davidson, D.S.O.
,, W. M. MacDowall.
,, T. J. Wright.
,, F. J. Turner.
,, M. F. Grant.
Captain H. C. Winckworth.
,, A. M. Rose.

Scottish.

Captain J. D. Richmond.
,, E. C. Whitehead.
,, M. G. Dill.

TRANSFERS BETWEEN COMMANDS AT HOME.—Lieutenant-Colonel J. F. Donegan, from Southern Command to Eastern Command.

QUALIFICATIONS.—Lieutenant G. H. Dive has obtained the Membership of the Royal College of Physicians, London, and the Diploma in Public Health of the University of Oxford.

ROSTER FOR SERVICE ABROAD.—The following exchanges have been approved: Majors W. T. Mould and J. J. W. Prescott, D.S.O.; Majors G. S. McLoughlin, D.S O. and F. J C. Heffernan.

RESULTS OF EXAMINATIONS.

Passed for promotion to the rank of Captain in (b). T B. Nicholls; J. A. Clark A. E. G. Fraser.

DISCHARGES.

6140	Serj.-Major	Nelson, F. W. ..	12.6.11	Having reached the age.
8808	S.-Serj ..	Davies, C.	26.6.11	Termination of second period.
7662	,, ..	Payne, T. G. ..	30.6.11	After 3 months' notice.
8813	Corporal ..	Whitrow, E. T. H.	6.7.11	Termination of second period.
9441	,, ..	Allen, W.	10 7.11	At his own request after 18 years' service.
148	Lce -Corpl.	Allbeury, T. H. ..	8.6.11	Art. 1058 (1) R.W.
18759	,, ..	Bogosoff, T. J. ..	10.7.11	,, ,,
1355	Private ..	Wilson, J.	20.5.11	,, ,,
5504	,, ..	Addison, H: ..	10.6.11	Payment of £10.
4874	,, .	Besznak, F. H. B...	3.7.11	Medically unfit
1834	,, ..	Burns, H.	4.7.11	,, ,,
12528	,, ..	Davies, T. H. ..	13.7.11	Termination of first period.

TRANSFERS TO ARMY RESERVE.

1839	Pte.	Morgan, F. ..	10.6.11	18886	Pte.	Walsh, P. ..	23 6 11
1838	,,	Crompton, E. J.	10.6.11	18896	,,	Hunter, D. ..	24.6 11
18828	L.-Cpl.	Reading, J. L. ..	10 6.11	18891	,,	Rainger, C. ..	26.6 11
18829	,,	Chesterman, F.E.	11.6.11	19965	L-Cpl.	Reilly, J ..	28 6.11
18847	Pte.	McCormick, J ..	15.6.11	18901	Pte.	Milford, T. ..	28 6.11
16811	Serjt.	White, O.	16.6.11	1850	,,	Pickett, T. P. ..	29.6.11
18864	L.-Cpl.	Thorburn, J. ..	16.6.11	18897	,,	Blakeman, W. ..	25 6.11
18851	Pte.	Davis, T E. ..	16.6.11	1851	,,	McVey, J. ..	30.6.11
18866	,,	Thomas, K. ..	17.6.11	1846	,,	Macfarlane, A...	28 6.11
18867	,,	Hogg, T. ..	18.6.11	18784	,,	Turner, F ..	1.6.11
19095	,,	Furze, V. ..	20.6.11	1852	,,	Frame, C. ..	3.7.11
18895	,,	Purdy, J. ..	18.6.11				

TRANSFERS TO OTHER CORPS.

4397	Private ..	Horsburgh, H. ..	1.7.11	To 2nd Batt. Royal Warwick Regt.

TRANSFERS FROM OTHER CORPS.

10830	Serjeant ..	Davidson, A. ..	24.6.11	From Northern Nigeria.
5567	Private ..	Gilmour, T. ..	1.4.11	,, K. O. Scottish Borderers.

PROMOTIONS.

SERJEANT-MAJORS.

10993	Qmr.-Serjt.	Reynolds, R. S. A.	13.6.11	*Vice* F. W. Nelson.

APPOINTMENTS.

LANCE-CORPORALS.

1305	Private ..	Prince, H. M. ..	19.6.11	Special under para. 281, S.O. R.A.M.C.
19747	,, ..	Hyde, C. H. ..	21.6.11	Special under para. 281, S.O. R.A.M.C.
2113	,, ..	Beckers, H... ..	21.6.11	Special under para. 281, S.O. R.A.M.C.
1620	,, ..	Pegg, A. E... ..	21.6.11	Special under para. 281, S.O. R.A.M.C.

BUGLERS.

5234	Boy ..	Mills, H. St. J. ..	9.6.11	Appointed Bugler.

BUGLERS TO THE RANKS.

1406	Bugler ..	Newland, F. ..	2.6.11	Bugler to the Ranks
2091	,, ..	Elwood, T. W. ..	21 6.11	,, ,, ,,

THE FOLLOWING N.C.O.'s AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

FOR STAFF-SERJEANT.

15634	Serjeant ..	Drummond, W. H. E.	12743	Serjeant ..	Wilson, T. R.
12504	,, ..	Shepherd, E.	18385	,, ..	Coupland, F. W.

FOR SERJEANT.

11024	Lce.-Serj.	Catherall, W.	12413	Corporal ..	Russell, E. J.
15783	Corporal ..	Lloyd, E. F. H.	19933	,, ..	Savegar, W. C.
16259	,,	Thomson, W.			

FOR CORPORAL.

19001	Private ..	Barritt, J.	19975	Private ..	Lee, R. J.
19135	,, ..	Quelch, W. H.	284	,, ..	Gregory, A. O.
1953	,, ..	Marchant, H.	4584	,, ..	Walsh, J. W.
955	,, ..	McKechnie, R.			

QUALIFIED AS DISPENSERS.

2113	Private ..	Bickers, H.	18854	Lce.-Corpl.	Forge, C. D.
19747	,, ..	Hyde, C. H.	1798	Private ..	Gilbert, R. R.
1620	,, ..	Pegg, A. E.	226	,, ..	Wilks, A. H.
470	,, .	Claridge, H. A.	19037	Lce.-Corpl.	Thomas, W. B.
12413	Corporal ..	Russell, E. J.			

DEATH.

4750	Private ..	Spink, C. J. ..	16.5.11	Chatham.

NOTES FROM ALDERSHOT.—Serjeant-Major G. H. Roberts, writes:—"Sport of all kinds has languished in the Corps here of late owing to the many extra duties having to be performed by its members, chief of which might be mentioned: Field ambulance training in camp and Coronation duties.

"A descriptive report of these, although useful, would not I am afraid be much appreciated as 'Corps News.'

"Many excellent games of cricket have been played by the Corps' 'First Team,' and although without a victory to date (July 3, 1911) to their credit, have put in some highly creditable scores, but alas! their opponents have done the same. This of course points to the weakness of our trundlers. A good fast bowler would prove a treasure to the team just now; such a one is being sought among the Companies here.

"The Corps 'Second Team' have been more fortunate, having many victories on record. It might be added, however, that their opponents are of a different calibre, being more of the holiday kind.

"Many departures from the Command will occur during the forthcoming trooping season and some will be keenly missed from our cricket arena, amongst whom are Captains A. R. Greenwood and J. S. Bostock, two of our best 'bats' and reliable run getters.

"The Corps here has lost, I trust only temporarily, the cricket services of Staff-Serjeant Steele, who is about to leave for a tour of duty in Sierra Leone. Before his departure he was entertained at the Serjeants' mess and given a hearty send-off.

"A very enjoyable evening was spent on Friday, May 23, 1911, at the Swan Hotel, Farnborough—the occasion being the departure of the 1st Northern General Hospital from the Connaught Hospital, where they had been training with No. 2 Company. An excellent musical and vocal programme was arranged.

"Special mention must be made of Serjeant Gale of the 1st Northern General Hospital, whose finely trained voice was heard to special advantage in the spacious concert room. Private Sumner's rendering of the Company's now favourite item was delivered with good taste and much feeling. The humorous element was very safe in the hands of Privates Turnbull and Price.

"About 10 p.m. all partook of a substantial supper provided by the Northern General Hospital, after which the usual speeches were indulged in. Serjeant-Major Mogoran in a nice little speech, referred in very complimentary terms to No. 2 Company, this was responded to by one of its members.

"The accompanists were Corporal Meggin, Corporal Steer and Private Griffiths.

"The initial game of the annual cricket fixture between the Officers and Serjeants, R.A.M.C., was played on the Corps Recreation Ground, on July 6, the result being one that rarely happens in cricket, viz., a tie, 101 runs each side.

"Ideal weather prevailed and a most enjoyable day's play was witnessed. Refreshments (including an excellent tea) were thoughtfully provided in a large marquee by the Officers.

SCORES.

Serjeants.

1. Serjeant Avery	21	b. Captain J. S. Bostock
2. Lance-Serjeant Tollafield.. ..	0	b. Captain J. S. Bostock
3. Serjeant Sharpe	0	Not out
4. Serjeant-Major Bollen	13	b. Captain A. R. Greenwood, c. Lieutenant J. D. Bowie
5. Serjeant-Major Roberts	8	b. Captain A. R. Greenwood, c. Captain L. Cotterill
6. Serjeant Taylor	4	b. Captain J. S. Bostock
7. Quartermaster-Serjeant Taylor ..	20	b. Captain A. R. Greenwood, c. Major N. H. Ross
8. Lance-Serjeant Miller	3	b. Captain J. S. Bostock, c. Major F. M. Mangin
9. Serjeant Wynn	0	b. Captain J. S. Bostock
10. Serjeant Moore	7	lbw, b. Captain J. S. Bostock
11. Staff-Serjeant Enwright	9	b. Captain J. S. Bostock
	85	
Extras ..	16	
	101	

Officers.

1.	Major N. H. Ross	5	b. Serjeant-Major Roberts, c. Serjeant Tollafield
2.	Lieutenant Leaver	1	b. Serjeant-Major Roberts
3.	Captain L. Cotterill	2	b. Serjeant-Major Bollen
4.	Captain E. Ryan	5	b. Serjeant-Major Roberts
5.	Lieutenant-Colonel G. D. Hunter, D.S.O.	21	b. Serjeant Miller, c. Serjeant Tollafield
6.	Major F. M. Mangin	1	b. Serjeant Miller, c. Serjeant Moore
7.	Major J. W. Langstaff	0	b. Serjeant Miller
8.	Lieutenant J. D. Bowie	9	b. Serjeant-Major Bollen, c. Serjeant Tollafield
9.	Captain A. R. Greenwood	2	b. Serjeant Miller
10.	Major B. Forde	3	b. Serjeant-Major Roberts
11.	Captain J. S. Bostock	44	Not out
		93	
	Extras	8	
		101	

Bowling.

Captain A. R. Greenwood	3 wickets	for 40	runs
Captain J. S. Bostock	7 ,,	45	,,
Serjeant Miller	4 ,,	21	,,
Serjeant-Major Roberts	4 ,,	33	,,
Serjeant-Major Bollen	2 ,,	38	,,

"For the Officers, Lieutenant-Colonel G. D. Hunter batted in the style reminiscent of his cricketing days in Egypt, compiling 21 runs. Captain J. S. Bostock proved the stalwart of his team, contributing 44, not out, in his vigorous and characteristic way. Captain A. R. Greenwood failed, being dismissed by a ripping ball from Serjeant Miller. This was cause for much joy among the Serjeants, who then saw visions of a victory. Success was however foiled by the united efforts of Major B. Forde, and Captain J. S. Bostock for the last wicket; the latter manipulated the bowling cleverly, but with the scores equal, Major Forde had to face the bowling and was dismissed by a good length ball amidst great excitement.

"For the Serjeants, Serjeant Avery batted in his own inimitable manner for a well played 21. Quartermaster Serjeant Taylor contributed 20 by dashing and vigorous cricket."

THE ROYAL ARMY MEDICAL CORPS SPORTS.

In giving the results of the many items I fall back on the report of our local paper, a slip of which I append :—

"The annual sports meetings of the Royal Army Medical Corps have for many years past been regarded as one of the most important athletic events of the Aldershot Command, and invariably attract a huge gathering to the Corps Recreation Ground in the Queen's Avenue. The meeting this year, held on Wednesday, was no exception, for both from the athletic and social standpoints the event provided a great deal of interest to a host of people outside the Corps.

"The programme, too, was quite in accordance with the high repute held by the Corps in the athletic world, thirty-two events being down for decision, needing a preliminary meeting on Tuesday to get some of the events off and reduce others to manageable proportions, the distribution of prizes, kindly undertaken by Lady Gallwey, being made amid great enthusiasm just before 7 p m.

"All thoroughly enjoyed the meeting. Favoured with glorious weather, the sports proved most interesting, and the well varied events were all keenly contested.

"Surgeon-General G. W. Robinson, C.B., Principal Medical Officer, and the officers entertained in hospitable style in a spacious enclosure on the west side, which was filled with a large assemblage of notable people. The large tea marquee presented a charming spectacle in its pretty floral decorations. The serjeants, also, had a well-filled enclosure, and entertained on a lavish scale in their established good style, and the other ranks of the Corps were also well catered for.

"During the afternoon the band of the Corps, under the direction of Mr. J. P. Robertson, bandmaster, played the following programme of music: Triumphal march, "Entry of the Gladiators," Fucik; selection, "The Arcadians," Monckton and Talbot; valse, "Ravissante," Godin; dance, "In the Shadows," Finck; overture, "Mirella," Gounod: "Reminiscences of all Nations," Fred Godfrey; song (cornet solo), "Mary," Richardson; valse, "Traumideale," Fucik; "The Warbler's Serenade," Perry; selection, "The Yeomen of the Guard," Sullivan.

"The interest in the sports was added to by the addition of two more challenge trophies, both open to the Corps at large—the Cyclists Cup and the Robinson Relay Cup—the latter being a gift from the Principal Medical Officer, and won for the first time by No. 1 Company. It is doubtful if a finer race for its possession will ever be seen, for A Company had a team that made the winners go hard for victory right up to the last yard, the last pair in the relay, Lance-Corporal Prince and Private Elsey, the keenest of opponents, and fellow-members of the Surrey A.A., putting up a most exciting race to the finish. Private Elsey won the Johnston Challenge Cup for the mile, and Lance-Corporal Prince won the trophy for the best all-round athlete. B Company carried off the Stretcher Challenge Shield, after a contest so close that the judges had some difficulty to separate the competitors, and No. 2 Company won the tug-of-war after a terrific contest against a much heavier team, having to pull them all over twice, not an easy or enviable task on a broiling hot day. Serjeant-Major Roberts, of the Connaught Hospital, who has many notable athletic successes to his credit in past years, won the 120 yards handicap for warrant officers and serjeants, starting from the 11 yards' mark. The scratch men, Serjeants Leggett and Rogers, gave him a good run, being right on his heels at the tape. It is the first time that a warrant officer has won this race, we are given to understand, since 1885.

"Throwing the cricket-ball: 1st, Private Lee, A Company, 91½ yd.; 2nd, Corporal Mack, C Company, 87 yd.; 3rd, Private Gillham, No. 1 Company, 84 yd.

"Putting the shot 1st. Corporal Mack, C Company, 30 ft.; 2nd, Private Brisbane, No 3 Company, 28 ft. 3 in.; 3rd, Corporal Hazell, No. 3 Company, 28 ft. 1 in. Major Ross, in a trial put, equalled the winner's distance.

"Long jump: 1st, Corporal Rogers, B Company, 18 ft. 10 in.; 2nd, Private Jepp, A Company, 17 ft. 11 in.; 3rd, Corporal Prince, No. 1 Company, 17 ft. 9½ in

"220 Yards for Privates: A field of ten started. 1st, Private Jepp, A Company; 2nd, Private Reeves, A Company; 3rd, Private Wilson, No. 2 Company Won by 2 yd. and 4 yd. in 25 sec.

"Veterans' 120 yards race: 1st, Private Stilling, A Company, 2nd, Corporal Rogers, No. 3 Company; 3rd, Private Stevenson, C Company. Won by 10 yd, and 4 yd. in 16 min. 3-5 sec.

"220 Yards Corporals' race: 1st, Corporal Prince, No. 1 Company; 2nd, Corporal Miller, B Company; 3rd. Corporal Hazell, No. 1 Company. Won by 3 yd and 3 yd. Time 24 min. 2-5 sec.

"120 Yards. Serjeants.—1st, Serjeant-Major Roberts, No. 2 Company; 2nd, Serjeant Leggett, No. 1 Company; 3rd, Serjeant Rogers, No. 2 Company. Time 16 min. 1-5 sec. Leggett started scratch, and the winner had 11 yd. start.

"Hurdle race 1st, Corporal Mack, A Company; 2nd, Corporal Hazell, No. 1 Company; 3rd, Corporal Rogers, B Company. Won by 12 yd. and 3 yd. Time, 16 min. 1-5 sec. There were eight instead of ten flights of hurdles.

"Half-mile (open to the Corps at large): 1st, Corporal Prince, No. 1 Company; 2nd, Private Elsey, A Company; 3rd, Private Barker, A Company. Won by 14 yd. and 4 yd. Time, 2 min. 9 sec.

"Buglers' and boys' races: 1st, Boy Osborne; 2nd, Boy Taylor; 3rd, Boy Mason. Won by 6 yd. and 5 yd.

"Quarter-mile (open to the Corps at large). Heat 1: 1st, Corporal Prince, No. 1 Company; 2nd, Corporal Hazell, No. 3 Company; 3rd, Serjeant Rogers, No. 2 Company. Won by 3 yd. and 2 yd.: Heat 2—1st, Private Elsey, A Company; 2nd, Private Jepp, A Company; 3rd, Private O'Flaherty, A Company. Won by 6 yd. and 2 yd. Final: 1st, Private Elsey, A Company; 2nd, Corporal Prince, No. 1 Company; 3rd, Corporal Hazell, No. 1 Company. Won by 3 yd. and 2 yd. Time, 53 min. 3-5 sec. Private Jepp was just pipped for third place, after making a good effort.

"Children's races: Boys—1st, F. Forman; 2nd, A. Aldridge; 3rd, J. Vickers; 4th, W. Harrison. Girls: 1st, Emily Stelling; 2nd, Rosie Faulkner; 3rd, Gwennie Williams.

"Football Dribbling Contest: 1st, Corporal Prince, No. 1 Company; 2nd, Corporal Rogers, B Company. Won in fairly easy style by 7 sec.

"High jump: 1st, Corporal Mack, C Company, 4 ft. 10 in.; 2nd, Private Deacon, 4 ft. 9 in.

"100 yards: Heat 1—1st, Corporal Haigh, No. 2 Company; 2nd, Private Chaffe, B Company; won by a foot. Heat 2: 1st, Private Reeves, A Company; 2nd, Serjeant Rogers, No. 2 Company; won by inches after an exciting race. Heat 3: 1st, Private Jepp, A Company; 2nd, Corporal Hazell, B Company; won by inches. Heat 4: 1st, Serjeant Leggett, No. 1 Company; 2nd, Corporal Rogers, B Company; won by a yard. Final: 1st, Private Jepp, A Company; 2nd, Private Reeves; 3rd, Serjeant Leggett, No. 1 Company; won by a yard and inches in 1 min. 3-5 sec.

"Relay race (open to the Command): Teams of four, the first two running 220 yd. each, the third 440 yd., and the last 880 yd. Six teams started, the Queen's Bays leading on the first man by a few inches, the York and Lancasters then going right away and winning by 25 yd. in 3 min. 47 sec. A good race was seen for second place, the Serjeants of the 2nd Royal Dublin Fusiliers winning by 3 yd. from the Queen's Bays. The winning team was composed of Corporals Gray, Laing, Ussher, and Sharpe.

"Sack race: 1st, Boy Wells, A Company; 2nd, Lance-Corporal Rogers, B Company; 3rd, Private Wilson, No. 2 Company. This made the third successive year that Wells had won this event.

"Tug-of-war: Teams of ten, the best of three pulls all over. In the first round No. 2 Company beat A Company, No. 1 Company had a walk over, B Company scratching, and No. 3 Company beat C Company. Then No. 1 scratched to No. 3, who met No. 2 in the final. This was productive of a splendid contest. No. 2 won the first pull, after being all but taken over the line, a very long effort, and then in the second pull No. 2 had a much easier task, winning all the way. The winning team was ably coached by Staff-Serjeant Merchant, and was composed of Staff-Serjeant Robinson, Serjeant Miller, and Privates Hall, Green, Hunter, Coote, Norris, Johnston, Benjafield, and Titchener.

"Band race: 1st, Chittenden, bass viol; 2nd, Philips, bass drum, 3rd, Perry and Bagelly, tambourine and side drum.

"Consolation race, 440 yd.: 1st, Private Smith, A Company; 2nd, Private Wykes, No. 1 Company; 3rd, Private Chaffe, A Company. Won by 3 yd.

"The championship shield for the competitor making the highest number of points in the meeting was won by Corporal Prince, No. 1 Company.

"The R.A.M.C. Challenge Shield, open to the Corps at large for first dressing and stretcher work, was, as usual, one of the great features of the afternoon's competition. This trophy is very keenly contested, and was productive of great interest. The teams of six had to run 80 yards, dress a patient, according to wounds described on a docket attached to him. The greatest number of points were given for skill in dressing, points being added for care in handling and carrying, and celerity. The injuries to be dressed consisted of a fractured left forearm and a gunshot wound in right knee, with arterial bleeding. The judges found some difficulty in giving a decision, so well done was the work. They adjudged B Company the winners by a very narrow margin of points, with A Company and C Company equal for second place. The winning team consisted of Corporal Murray, with Privates Aldridge, Goodchild, Taylor, McLardie, and McCombie.

"Flirtation stakes for ladies, who had to run 80 yards, then find a gentleman with a card numbered the same as the one carried, and return with it to the starting point. Mrs. Cooper won, with Mrs. Miller second, Mrs. Boxall third, Mrs. Hazell fourth.

"One Mile, open to the Corps, for the Johnston Challenge Cup: 1st, Private Elsey, A Company; 2nd, Corporal Prince, No. 1 Company; 3rd, Private Barker. Won by 20 yd. and 10 yd.

"Bolster Fighting across a pole: 1st, Private Chittenden, C Company, 2nd, Private O'Flaherty, A Company; 3rd, Private Gillham, No. 1 Company.

"Two Miles Cycle race for the Elmsdale Challenge Cup: Heat 1: 1st, Private Smart, No. 1 Company; 2nd, Private Bigge, Netley. Won by 10 lengths slowing down. Heat 2: 1st, Private Connor, No. 2 Company; 2nd, Private Turner, No. 2 Company. Won by a quarter lap in comfortable fashion. Final: 1st, Private Connor, No. 2 Company; 2nd, Private Smart, No. 3 Company; 3rd, Private Turner, No. 2 Company. Won by three lengths and 40 lengths in 6 min. 19 sec.

"Bun and Treacle "Struggle": 1st, Boy Osborne, A Company; 2nd, Boy Steer, A Company; 3rd, Buglar Page, A Company.

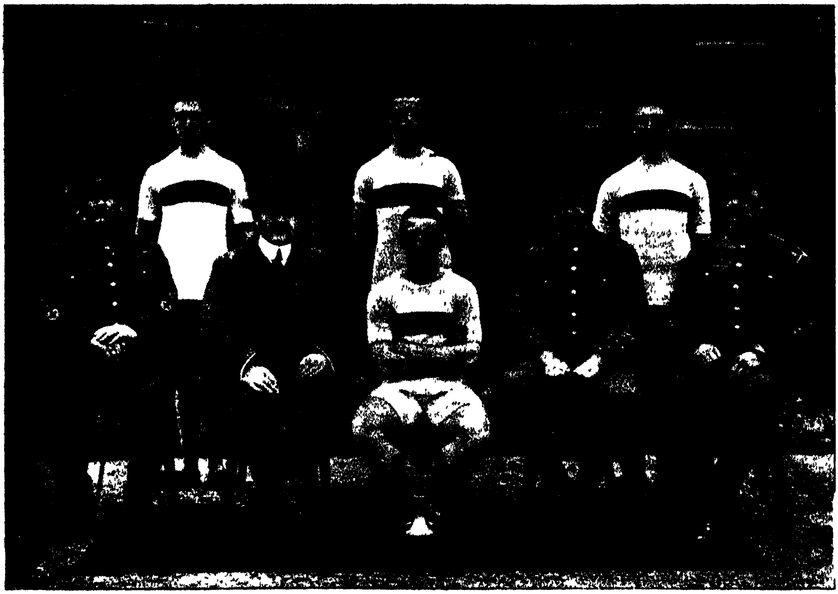
"Menagerie race: 1st, Serjeant Newton's baboon; 2nd, Private Stilling's ferret; 3rd, Private Honeyball's guinea-pig. A great amount of amusement was caused by the start, in which a snake was included, causing some commotion among the competitors

"Inter-Company Relay Race for the Robinson Challenge Cup: This was the first time that this trophy had been competed for, and great keenness was shown to become the first holders. No. 1 and A Companies raced neck and neck all through, Prince and Elsey in the last lap going all out, the former winning for No. 1 Company by 3 yd. in 3 min. 53 3·5th sec., A Company being second and No. 2 Company third. The winning team comprised Corporals Prince and Hazell, Serjeant Leggett, and Private Baigent.

"Bicycle Dispatch Riding Race : The competitors had to ride a lap, get a dispatch, and ride another lap, Private Wylie, No. 2 Company, winning by 30 yd. from Private Smart, No. 3 Company, Private Connor, No. 2 Company, being a good third.

"Officers' 120 Yards Handicap: All had to lie down, from which position they started. Lieutenant Simson won by 6 yd., with Lieutenant Caine second, and Major Ross third, a yard behind Colonel Peterkin, a well-known athlete, being a good fourth. Time, 16 sec.

WINNERS OF THE RELAY RACE FOR THE "ROBINSON CHALLENGE CUP."



Standing- Corporal Prince, Lance-Corporal Hazel, Private Baigent.
Sitting—Serjeant-Major Bollen, Colonel F. H. Treherne, Serjeant Leggett,
Captain J. S. Bostock, and Serjeant-Major Figg.

"Reveillé Competition : Teams of four, who had to pitch a tent and get inside, then on the sound of the reveillé they had to strike and pack the tent, and dress themselves in marching order and fall in. C Company's second team won after a very close contest, No. 1 Company's team being second, and C Company's first team third, very few points separating the whole. The winning team comprised Corporal Hampton and Privates Hill, Farley and Maydon.

"I enclose snapshot of some of the events which I trust will interest readers who will doubtless recognize some old faces.

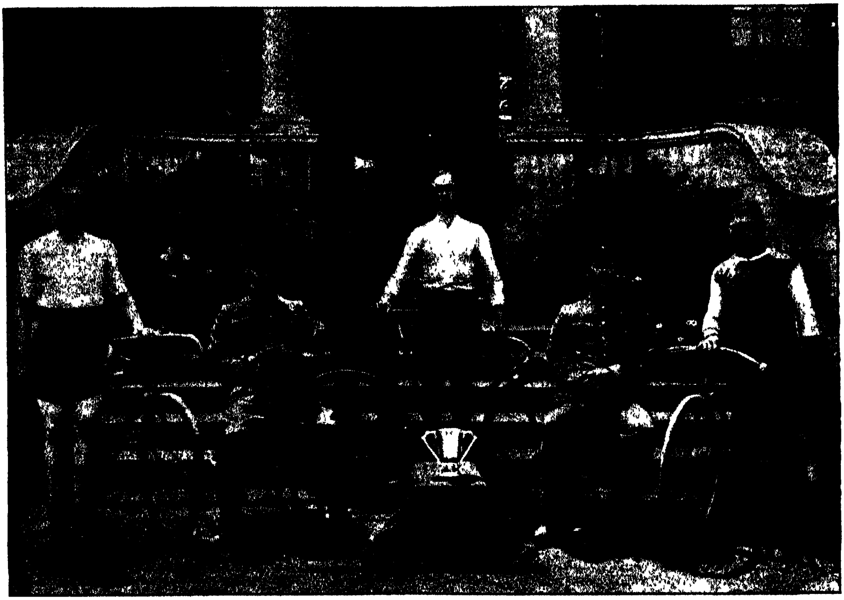
"It was generally agreed that a real surprise was sprung in the Serjeants' Race, it having been for years a monopoly of the 'Young Uns.' An 'Old Un' in the person of Serjeant-Major Bollen competed, finishing fourth. The winner is to try his luck in the Warrant Officers' race (200 yards) at the forthcoming Army Athletic Meeting.

"At the conclusion of the sports, Lady Gallwey graciously presented the prizes, for whom three cheers were called by Surgeon-General Robinson, which were lustily given, whereupon Serjeant-Major Bollen asked for the same for the Principal Medical Officer (Surgeon-General Robinson), and officers Royal Army Medical Corps, both calls being loudly responded to.

"About 8 p.m. the members of the Serjeants' Mess with their wives and friends gathered in the Serjeants' Mess, where a happy evening was spent in song and revel, terminating about 11 p.m., this closing a long, happy, and jolly day.

"The Committee consisted of: Lieutenant-Colonels F. H. Treherne, H. M. Sloggett, G. D. Hunter, D.S.O.; Majors C. K. Morgan, N. H. Ross, G. G. Delap, D.S.O.; Captains J. S. Bostock, L. Cotterill, F. N. Noke; Hon. Lieutenant and Quartermaster Gillman; Serjeant-Majors A. Bollen, G. H. Roberts, J. Woollard; Quartermaster-Serjeant Conolly; Staff-Serjeants Merchant, Squires, Watt; Serjeants March, Moore, Sproule; Corporals Cheer, Miller; Lance-Corporals Cook, Luxon, Privates Jepp, Chittenden, Ames, and Hazell.

WINNERS OF CYCLE EVENTS, CONNAUGHT HOSPITAL.



From right to left—Private Turner, Lieutenant-Colonel H. M. Sloggett, Private Connor, Serjeant-Major G. H. Roberts, Private Wylie.

"*Referee*. Major S. Guise-Moores.

"*Judges:* Lieutenant-Colonels F. H. Treherne, H. M. Sloggett, C. R. Tyrell, G. D. Hunter, D.S.O.

"*Judges for Corps Competitions:* Colonel A. Peterkin, Lieutenant-Colonel H. E. R. James.

"*Starters:* Majors N. H. Ross and G. G. Delap, D.S.O.

"*Hon. Sec.:* Captain F. S. Irvine.

"*Assistant Hon. Sec:* Staff-Serjeant J. M. Maxwell.

"*Clerk of the Course:* Staff-Serjeant Williams.

"These are to be congratulated. A special meed of praise is due to Captain F. S. Irvine, and Staff-Serjeant Maxwell, on whose shoulders most of the hardest work fell. Only those who have done the work in the past can realize what difficulties have to be contended with.

Congratulations were showered on the winners of the fine trophy recently presented for Companies by Surgeon-General G. W. Robinson, Principal Medical Officer, Aldershot Command.

"On the 15th inst. Corporal Prince won the half mile race open to the Garrison at the Annual Sports of the 2nd Royal Dublin Fusiliers. A great athletic future lies before this young N.C.O. if he can only restrain himself.

"Our Corps Relay Team have entered for the Relay Race at the forthcoming Army Athletic Meeting."

"EXTRACT FROM *Bournemouth Guardian*, DATED SATURDAY, JULY 15, 1911.

"There was an influx at Bournemouth on Saturday, the occasion being the annual outing of the Royal Army Medical Corps members of the Royal Army Temperance Association from Aldershot.

"The whole party of 250, about half of whom were in uniform, were in charge of Staff-Serjeant Williams, R.A.M.C. Dinner and tea were provided by Mr. Coles of Messrs. Bright's Restaurant, the catering being excellent. Swanage and other places of interest were visited.

"In view of the impression generally prevailing that there is little temperance in the Army, it must have been a surprise to many to find such a large body of abstainers from one Garrison centre, and the conduct of the men during the stay in town was worthy of every commendation."

NOTES FROM LONDON :—

VISIT OF H.M. QUEEN ALEXANDRA AND H.I.M. EMPRESS MARIE TO THE QUEEN ALEXANDRA MILITARY HOSPITAL AND ROYAL ARMY MEDICAL COLLEGE.

On Thursday, July 13, Their Majesties, who were accompanied by H.R.H. Princess Victoria, and attended by Sir Frederick Treves and the Hon. S. G. Holland, paid a private visit to the hospital and College. The Royal Party were received at the hospital by Lieutenant-Colonel J. Maher, the officer in charge, and Miss Martin, R.R.C., the Matron, and spent some considerable time in visiting the Chapel, kitchen and wards where Her Majesty spoke to many of the patients, subsequently visiting the new hospital for officers.

The Royal Party afterwards visited the Royal Army Medical College and were received by Colonel Risk, the Commandant and Director of Studies, Colonel Sir David Bruce, and the Professors. Their Majesties took great interest in the various departments, and in the arrangements for imparting instruction in tropical diseases and technical military medical subjects.

On the evening of July 16, Their Majesties and H.R.H. Princess Victoria, attended by Sir A. Davidson, again paid a short visit to the officers' hospital.

NOTES FROM MALTA.—Serjeant-Major F. E. Collard writes July 11, 1911:

"The month of June opened with the Parade in honour of His Majesty's birthday. The Corps supplied two medical officers, and sixty-seven N.C.O.'s and men on duty either with ambulance wagons or keeping the ground.

"The parade took place on the Marsa at 5.30 p.m. The Naval Brigade was formed up on the right, with the Royal Marines and Infantry Battalions on the left. It was a glorious evening and there were crowds of spectators.

"On June 22, Valletta was *en fête*. Strada Reale was beautifully and tastefully decorated, the local bands played at various points. Vehicular traffic was suspended in this locality owing to the enormous crowd.

"At 9.30 p.m. His Excellency the Governor gave the signal for the *feu-de-joie*, which passed around the Grand Harbour, beginning at Ricasoli, continuing from fort to fort to Corradino Heights, and returning by Crucifix Bastion to St. Elmo. The whole line of firing was lighted by men with torches. This and a salute of twenty-one guns constituted the Military Display The Naval Display followed, and finally, from Floriana, the Civil Display, which was considered the finest ever seen in the island. The pyrotechnical display concluded the events of the day about midnight.

"On July 1, the Serjeant-Major with the Serjeants' Mess tennis team and families were proceeding by brake *via* Zabbar to St. Julians. After passing the 'Farthing Church' the off-horse slipped, breaking the pole. Being on the down grade, the horses took fright, careered down the tortuous road, and collided with a stone wall. Our only casualty was Quartermaster-Serjeant Gibbs, who received a trifling injury to his leg, luckily nothing more serious.

"On July 4, in Rinella Bay, No. 1447 Private P. Conway when bathing in deep water about 50 yards from the shore, was seized with cramp and sank twice. Just as he was going down for the third and probably last time, Lance-Corporal Jenkins of 2nd Battalion Gloucestershire Regiment, fortunately reached him, and managed, although by no means a strong swimmer himself, to keep the drowning man afloat until Corporal Overton, R.A.M.C., came to the rescue and got the man ashore. Conway was insensible when landed, and the breathing had stopped. Artificial respiration by Schäfer's method was immediately resorted to, and after an anxious interval of ten minutes our suspense was relieved.

"The attached cricket items from the *Malta Herald* are forwarded:—

"'H.M.S. 'DUNCAN' *versus* ROYAL ARMY MEDICAL CORPS.

"'*Marsa, Thursday, July* 6.

"'The 'Duncan' won the toss and took first innings, Lieutenant Kinnear and Assistant Paymaster Rapkin being the first two to wield the willow, 27 runs being put on ere the Lieutenant fell to a good ball from Serjeant-Major Dudman. The paymaster continued to bat until beaten by a snake-like curl ball by Captain Beaman for 35. Lieutenant Harbottle started with a Jessop hit for six, and carried his score by big hits to 35 when he fell to the 'catch of the day' by Private Sayers. Assistant Paymaster Painter 13 and Surgeon Baxter 12 were the others to run into double figures. Private Burns and Lance-Corporal Hutchings showed the best bowling analysis for the 'Medicals,' taking 3 wickets for 18 and 2 wickets for 8 respectively.

"'Captain Gibson and Private Sayers started the innings for the 'Soldiers'; the former was not dismissed until he had gathered in 30 out of 41, Private Burns the next comer made 19 in fairly quick time before falling a victim to Lieutenant Collett's first ball, Major Thurston did not stop long, nor did Corporal Martin who was beaten by a good ball by the Lieutenant. Captain Beaman on joining Sayers made merry, scoring very quickly until stumped by the last ball by Lieutenant Harbottle off Mr. Collett. Private Sayers was still undefeated with 41 to his credit at the close of play, he having batted very patiently for his runs.

"'Lieutenant Collett for the Navy took 3 wickets for 18.

"'The 'Medicals' won by 5 wickets.

"'Both wicket keepers were in good form, Lieutenant Harbottle for the 'Duncan' and Corporal Martin for the Royal Army Medical Corps.

H.M.S. DUNCAN *v.* ROYAL ARMY MEDICAL CORPS.

H.M.S. Duncan.

Lieutenant Kinnear b. Dudman	6
Assistant-Paymaster Rapkin b. Beaman	35
Assistant-Paymaster Painter c. Gebson b. Beaman	13
Midshipman Baxter St. Martin b. Beaman	8
Lieutenant Boissier c. Major Thurston b. Beaman	9
Lieutenant Harbottle c. Sayer b. Hutchings	35
Surgeon Barrett, l.b.w., b. Hutchings	12
Lieutenant Johnston b. Burns	0
Lieutenant Collett c. Burns b. Hutchings	3
Midshipman Vereker b. Burns	1
Midshipman Steedman not out	0
Extras	3
Total	125

Royal Army Medical Corps.

Captain Gibson c. Harbottle b. Boissier	30
Private Sayers not out	41
Private Burns b. Collett	19
Major Thurston, l.b.w., b. Collett	3
Corporal Martin b. Collett	8
Captain Beaman, st. Harbottle b. Rapkin	30
Lance-Corporal Hutching Serjeant-Major Dudman Private Morrison Private Alloway Lance-Corporal Hyde	did not bat.
Extras	4
Total (for 5 wickets).	135

GOVERNOR'S CUP MATCH R.G.A. WEST *v.* R.A.M. CORPS.

Marsa, No. 1. *Ground.*

"Commenced at the Marsa on Monday, July 3, the Medicals batting first; the first four wickets fell for 47. Serjeant-Major Huntingford on joining Serjeant Talbot at once commenced to hit *à la* Jessop; the fifth wicket added 58 runs before Talbot was bowled by Gunner Chapman, the sixth and seventh wickets added a couple, Private Burns and the Serjeant-Major scored 24 before the latter was dismissed for a well played 52 marred by three lucky strokes when his score was 51; he hit a six and fourteen fours. Burns made 16 before falling a victim to Bombardier Chapman. The R.G.A. started with Gunners Bareham and Grounds, the former should have been caught by the wicket keeper with his score at 9 but he was not sent back until he had added another 19.

"Jessiman did not stay long, Bombardier Chapman played faultlessly for 28. On Tuesday Blease and Dingaven scored freely, though the latter was extremely lucky with 38. Lieutenant Burrowes and the last man, Gunner Marshall, added 28 for the last wicket; the Lieutenant had a merry innings with some Crosse and Blackwells thrown in; he was still undefeated with 34 to his credit at the end of the Gunners' innings.

"The Medicals started on their second venture after tea with Majors Norrington and Thurston; both played good cricket and the first wicket fell at 94, Major Norrington being l.b.w., with a score of 54. The next three wickets fell quickly for an addition of 33, Burns making 11; Major Thurston was not out with 53 at close of day's play.

"Continued on Wednesday, Private Sayers was dismissed without scoring, as was Serjeant Talbot; Corporal Hutching the next comer soon rattled up 21, Serjeant-Major Dudman was unluckily run out for 5, Major Thurston was ninth out for a well-timed 87; in his score were fourteen fours and one five. Corporal Turner scored 17 in five hits.

"The R.G.A. started at 4 o'clock with 124 to win, which was done with four wickets down; Brigadier Chapman 46, Gunner Grounds and Chapman scoring 31 and 26 not out respectively. A pleasant game ending in a win for the 'Gunners' by 6 wickets.

"Played on the Marsa on the 3rd and 4th instant.

ROYAL ARMY MEDICAL CORPS (1ST INNINGS).

Major Thurston run out	6
,, Norrington ,,	12
Private Sayers c. Lieutenant Burrowes b. Plowman	9
Captain Beaman c. Dingaven b. Plowman	9
Serjeant Talbot b. Gunner Chapman	18
Serjeant-Major Huntingford c. Lieutenant Burrowes b. Bombardier Chapman	52
Lance-Corporal Hutchings b. Bombardier Plowman	0
Corporal Martin b. Gunner Chapman	0
Private Burns b. Bombardier Chapman	16
Serjeant-Major Dudman not out	3
Corporal Turner b. Bombardier Chapman	0
Extras	19
	144
2nd Innings	209
Total	353

ROYAL GARRISON ARTILLERY WEST.

Gunner Bareham c. Payers b. Dudman	28
,, Grounds c Dudman b. Beaman	12
Bombardier Jessiman c. Beaman b. Dudman	9
Gunner Frazer hit wicket, b. Beaman	12
Bombardier Chapman b. Dudman	28
Gunner Chapman b. Dudman	4
Bombardier Blease c. Huntingford b. Beaman	29
,, Dingaven c. Martin b. Talbot	38
,, Plowman c. Beaman b. Dudman	0
Lieutenant Burrowes not out	34
Gunner Marshall b. Huntingford	18
Extras	19
Total	231

ROYAL ARMY MEDICAL CORPS. (2ND INNINGS)

Major Thurston c. Lieutenant Burrowes b. Marshall	87
„ Norrington l.b.w. b. Frazer	54
Private Burns b. Bombardier Chapman	11
Captain Beaman c. Lieutenant Burrowes b. Gunner Chapman	0
Serjeant-Major Huntingford c. Lieutenant Burrowes b. Bombardier Chapman	5
Serjeant Talbot b. Gunner Chapman	0
Private Sayers b. Gunner Chapman	0
Lance-Corporal Hutchings b. Bombardier Chapman	21
Serjeant-Major Dudman run out	5
Corporal Martin c. Jessiman b. Blease	5
Corporal Turner not out	17
Extras	4
Total	209

ROYAL GARRISON ARTILLERY WEST. (2ND INNINGS)

Gunner Grounds b. Dudman	31
Bombardier Chapman c. Burns b. Talbot	46
„ Jessiman b. Captain Beaman	13
Gunner Frazer c. Major Norrington b. Dudman	0
„ Chapman not out	26
Bombardier Blease not out	6
„ Dingavon Lieutenant Burrowes Bombardier Plowman Gunner Marshall „ Bareham did not bat.	
Extras	2
For 4 wickets	124

Bowling Analysis, Royal Garrison Artillery (1st Innings).

	Overs	Runs	Maid	Wickets	Average
Blease	7	27	—	—	—
Bombardier Chapman	11·5	24	4	3	8·00
Gunner Chapman	9	25	3	2	12·50
Plowman	8	23	—	3	7·66
Marshall	2	9	—	—	—
Fraser	2	17	—	—	—

Bowling, Royal Army Medical Corps (1st Innings).

	Overs	Runs	Maid	Wickets	Average
Beaman	18	89	1	3	29·66
Dudman	21	83	2	5	18·60
Hutchings	6	22	1	—	—
Thurston	1	1	—	—	—
Talbot	3	13	—	1	13·00
Huntingford	4	4	—	1	4·00

Bowling, Royal Garrison Artillery, 2nd Innings

Gunner Chapman	3 wickets for 58.
Bombardier Chapman	3 „ „ 44.

Royal Army Medical Corps.

Serjeant-Major Dudman	2 wickets for 30."

NOTES FROM HONG KONG.—Private David Davies writes, June 26, 1911:—

"ANNUAL PICNIC.

"The 27th Company, Royal Army Medical Corps, held their Annual Picnic on Saturday, June 24. They proceeded from Hong-Kong at 12 noon by Government launch to Dumbell Island. The sea was a little choppy, but the weather was most favourable. The party included friends belonging to the Royal Garrison Artillery, Royal Engineers, Royal Marines, and Army Service Corps. Shortly after arrival tiffin was partaken of, and afterwards some time was spent in visiting local places of interest and bathing. At 4.30 tea was served, and at 5.30 all aboard and first turn of propeller homeward. Upon their return to Hong-Kong the merry party had to separate, with regret, after having spent a most enjoyable time together. Too much praise cannot be given to Private Stanley G. Elston for the success of the picnic, as he has worked very hard with the arrangements, and, indeed, he carried out his duties as President most admirably. He was aided by a very able Committee, consisting of Lance-Corporal Heard, Privates Hanrahan, Farrell, Bamford, and Shepperd, to whom also great credit is due."

NOTES FROM BLOEMFONTEIN.—Major H. B. Fawcus writes, June 19, 1911: "It is some time since any news from Bloemfontein appeared in the Journal. Many changes have taken place in the last few months. Colonel Lambkin, after a short period as Senior Medical Officer, has been promoted and appointed Administrative Medical Officer. Lieutenant-Colonel Hanley has arrived from Dublin and taken over command of the hospital and 24th Company, Royal Army Medical Corps. Major Forde has gone home, tour-expired; and Major Johnson has left on six months' leave.

"Captain Symons has taken Major Johnson's place as Medical Officer in Charge, Naval Hill, and is at the present time on his honeymoon in Natal, his wedding having taken place three days ago. The other officers at this station are Majors Poe and Fawcus (the latter having just received promotion), Captains Anderson, Bryden, and Vidal, Lieutenant Pollard, and Captain and Quartermaster Clapshaw.

"The cricket season has been a most successful one. Our team was probably the best single company team of the Royal Army Medical Corps that has ever played together. We were able to compete with the full regimental teams of the garrison, and were unlucky not to annex the Garrison Cricket Cup. In our match with the 2nd Battalion, D.C.L.I., the ultimate winners of the Cup, we were just beaten by one wicket after four days play. The result would undoubtedly have been reversed if Captain Vidal had not had the misfortune to fracture his jaw and Private Sinclair to injure his hand during the course of the match. In Private Sinclair we have a young cricketer of great ability. He is an excellent bat, a splendid field, and with practice will make a good wicket-keeper. The bowling of Staff-Serjeant Granger, who arrived late in the season, was of great assistance in our later matches.

"The results of matches and averages for the season are appended.

CRICKET AVERAGES FOR SEASON 1910 AND 1911.

Batting. (*All Important Matches*).

Name	Number of innings	Runs	Most in an innings	Times not out	Average
Major Fawcus	10	495	141	4	82·50
Lieutenant Pollard	6	176	61	–	29·33
Captain Symons	8	158	36	1	22·57
,, Bryden	17	318	61	2	21·20
Private Sinclair	27	469	55	4	20·39
Captain Vidal	11	171	55	2	19·00
Serjeant Girling	25	416	77	2	18·08
,, Bell	17	211	44	3	15·07
Private Haylock	30	335	48	6	13·95
Quartermaster-Serjeant Polhill	18	238	29	—	13·22
Private Davis	7	61	28	2	12·20
,, Phillips	17	164	37	1	10·25
,, Gowing	27	208	29	5	9·45
Quartermaster-Serjeant Allwork	5	38	24	—	7·60
Private Pilgrim	20	120	21	1	6·32
Staff-Serjeant Granger	8	29	13	1	4·14

Qualification, 5 innings.

Bowling

Name	Number of overs	Runs	Wickets	Average
Captain Symons	7	29	8	3·62
Major Fawcus	136	415	46	9·02
Private Gowing	76·3	302	32	9·43
Quartermaster-Serjeant Polhill	91·4	330	34	9·70
Captain Vidal	69·2	234	24	9·75
Staff-Serjeant Granger	87	323	33	9·78
Private Pilgrim	126·3	509	49	10·30
Serjeant Bell	41	147	13	11·30
Lieutenant Pollard	29	76	5	15·20
Private Phillips	51	180	9	20·00

Qualification, 5 wickets.

Total all matches played, 32; won, 18; drawn, 1; lost, 13.

Company League: Played, 11; won, 10; lost, 1.

"The Annual Company Challenge Cup Competition was held on the School of Musketry Range, on Whit-Monday, and a most enjoyable afternoon was spent.

"The officers and ladies present were: Lieutenant-Colonel and Mrs. Hanley, Major and Mrs. Poe, Major and Mrs. Fawcus, Captain Bryden, Captain Vidal, Lieutenant A. M. Pollard, and Captain and Quartermaster Clapshaw and Mrs. Clapshaw, forty of the company, and several visitors.

"Two marquees were erected in which refreshments were provided.

"Serjeant-Major Lazzel, School of Musketry, Staff, acted as umpire for the shoot.

"The ranges for the Challenge Cup and monthly spoon were:—

"*Cup Competition.*—200, 500, and 600 yards, 1st class target, 10 rounds at each range, all to count, service rifles and ammunition, the painting of sights only, being permitted.

"*Spoon Shoot.*—400 yards, 10 rounds, 1 sighting shot, 9 to count.

"The names of the prize-winners and prizes awarded were as follows:—

Best aggregate at 3 ranges, challenge cup, medal and	£1	10	0	Staff-Serjt. Richardson.
2nd best aggregate at 3 ranges	0	15	0	Corporal Brunton
3rd ,, ,, 3 ,,	0	7	6	Serjeant Harvey.
4th ,, ,, 3 ,,	0	5	0	Private Barker.
Best score at 600 yards	1	5	0	,, Barker.
2nd best score at 600 yards	0	15	0	Captain Bryden.
3rd ,, ,, ,, ,,	0	7	6	Corporal Brunton.
4th ,, ,, ,, ,,	0	5	0	Staff-Serjt. Richardson.
Best score at 500 yards	1	5	0	Private E. V. Brewer.
2nd best score at 500 yards	0	15	0	Serjt.-Major Barnard.
3rd ,, ,, ,, ,,	0	7	6	Serjt. Bell.
4th ,, ,, ,, ,,	0	5	0	,, Harvey.
Best score at 200 yards	1	5	0	Private Pilgrim.
2nd best score at 200 yards	0	15	0	,, Barker.
3rd ,, ,, ,, ,,	0	7	6	Serjt. Harvey.
4th ,, ,, ,, ,,	0	5	0	Major Fawcus.

"The spoon was won by Private E. B. King.

"The prizes were presented by Surgeon-General O. E P. Lloyd, V.C., C.B., at his inspection of the Military Hospital and '24' Company, Royal Army Medical Corps, Tempe. on June 8, 1911.

"The prize money, won by Major H. B. Fawcus and Captain R. A. Bryden, was given to the club for purchase of a spoon, to be fired for at the next practice shoot.

"The monthly spoon for June was shot for, at 500 yards, on the 15th instant, and won by Lance-Serjeant Girling (scratch), with the magnificent score of 40 out of a possible 45; the next best score, S.-Major Barnard (+ 6) 39."

NOTES FROM SIMLA.—Major H. G. F. Stallard, R.A.M.C., Officiating Secretary to the Principal Medical Officer, His Majesty's Forces in India, writes as follows, June 15, 1911:—

"*Appointments.*—Colonel M. W. Kerin appointed Principal Medical Officer, 7th (Meerut) Division, *vice* Colonel F. B. Maclean, retired.

"Colonel L. E. Anderson appointed Principal Medical Officer, Bareilly, Garhwall and Dehra Dun Brigades, *vice* Colonel Kerin, transferred.

"Colonel H. J. R. Moberly appointed to officiate as Principal Medical Officer, 9th (Secunderabad) Division.

"Colonel R. I. D. Hackett appointed Principal Medical Officer, Abbottabad and Sialkot Brigades.

"*Specialists.*—The undermentioned officers have been appointed Specialists in the subjects noted against them: Captain G. F. Sheehan, R.A.M.C., Mental Science, Northern Army; Captain G. F. Dawson, R A.M.C., Dermatology, 7th (Meerut) Division; Captain A. Dawson, R.A.M.C., is recognized a Specialist in Prevention of Disease and appointed to the charge of Enteric Fever Convalescent Depot at Wellington."

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Lieutenants have been confirmed in their rank. Philip S. Vickerman, M.B, John J. M. Shaw, M.B.

To be Lieutenants (on probation). Cadet Serjeant Robert Alfred Greenwood, from the Edinburgh University Contingent, Officers' Training Corps, dated June 23, 1911; Cadet Private Hubert Cox, from the Birmingham University Contingent, Officers' Training Corps, dated June 2, 1911; Cadet Serjeant Philip Norman Button, from the University of London Contingent, Officers' Training Corps, dated June 19, 1911.

Lieutenant (on probation) Edward A. Gregg resigns his commission, dated July 8, 1911

Major Edward C. Thompson, M.B., relinquishes his commission, dated July 15, 1911.

TERRITORIAL FORCE.

INFANTRY.

5th Battalion, The Prince of Wales's Own (West Yorkshire Regiment).—Surgeon-Lieutenant-Colonel Frederick Shann resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated June 17, 1911.

ROYAL ARMY MEDICAL CORPS.

2nd Highland Field Ambulance, Royal Army Medical Corps.—Charles Cameron, M.B., to be Lieutenant, dated April 1, 1911

1st West Lancashire Field Ambulance, Royal Army Medical Corps.—Lieutenant Creighton H. Lindsay, M.D., to be Captain, dated May 25. 1911.

3rd West Lancashire Field Ambulance, Royal Army Medical Corps.—John James Buchan, M.D., to be Lieutenant, dated May 1, 1911.

2nd North Midland Field Ambulance, Royal Army Medical Corps.—William Isaac Cumberlidge, F.R.C.S.(Eng.), to be Lieutenant, dated May 13, 1911.

Lieutenant Roger K. Hamilton resigns his commission, dated June 14, 1911.

3rd North Midland Field Ambulance, Royal Army Medical Corps.—William Henry Hinde to be Transport Officer, with the honorary rank of Lieutenant, dated May 6, 1911.

1st Northern General Hospital, Royal Army Medical Corps.—Major Henry B. Angus, M.B., F.R.C.S., to be Lieutenant-Colonel, dated January 11, 1911.

Captain Joseph W. Leech, M.D., F.R.C.S., to be Major, dated January 11, 1911.

2nd East Anglian Field Ambulance, Royal Army Medical Corps.—Quartermaster and Honorary Lieutenant William T. Blazeby resigns his commission, dated June 17, 1911.

Transport Officer and Honorary Lieutenant Robert Staff Mason to be Quartermaster, with the honorary rank of Lieutenant, dated June 17, 1911.

Edward James Edwards to be Transport Officer, with the honorary rank of Lieutenant, dated June 17, 1911.

2nd Home Counties Field Ambulance, Royal Army Medical Corps.—Lieutenant-Colonel Albert R. Henchley, M.D., reverts at his own request to the rank of Major, dated June 16, 1911.

Major Albert R. Henchley, M.D., resigns his commission, dated June 17, 1911.

3rd Western General Hospital, Royal Army Medical Corps.—Captain Edgar Reid, from the List of Officers attached to Units other than Medical Units, to be Captain, whose services will be available on mobilization, dated June 24, 1911.

North Midland Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Transport Officer and Honorary Captain Samuel H. Bishop is granted the honorary rank of Major, dated April 19, 1911.

2nd Wessex Field Ambulance, Royal Army Medical Corps.—Lieutenant Robert Burnet, M.B., from the 3rd East Lancashire Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated May 10, 1911.

1st Northern General Hospital, Royal Army Medical Corps.—Frederick George Armstrong, M.B. (late Lieutenant, 1st Northumbrian Field Ambulance, Royal Army Medical Corps) to be Captain, dated May 12, 1911.

1st Southern General Hospital, Royal Army Medical Corps.—Quartermaster and Honorary Lieutenant Albert Hastings resigns his commission, dated July 5, 1911.

3rd Western General Hospital, Royal Army Medical Corps.—Surgeon-Captain Francis Griffith Thomas, from the 1st Welsh (Howitzer) Brigade, Royal Field Artillery to be Captain, whose services will be available on mobilization, dated July 5, 1911.

2nd Eastern General Hospital, Royal Army Medical Corps.—The undermentioned officers to be Lieutenant-Colonels, dated May 21, 1911 : Major Edward F. Maynard, M.D., Major Frederick J. Paley, M D.

The undermentioned officers to be Majors, dated May 21, 1911.—Captain Frank G. Bushnell, M.D., Captain Walter A. Bowring, F.R C.S.

Captain William D. Calvert resigns his commission, dated July 8, 1911.

Officers attached to Units other than Medical Units.

The undermentioned officers resign their commissions, dated June 14, 1911 . Captain Robert W. Meikle, Captain John Cameron, M.B.

Gerald Russell Rickett, M.D. (late Lieutenant, 3rd Middlesex Royal Garrison Artillery Volunteers, to be Lieutenant, dated May 1, 1911

Daniel Ross Kilpatrick, M D., to be Lieutenant, dated May 5, 1911.

Lieutenant George Morley Arundel Thomas, from the 2nd Welsh Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated June 14, 1911.

Major David R. Oswald, M.B., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated June 17, 1911.

Captain Thomas H. Thomson, M.D., resign his commission, dated June 17, 1911.

Robert Hill Shaw, M.D., to be Lieutenant, dated May 20, 1911.

Robert Proudfoot, M.B., to be Lieutenant, dated May 20, 1911.

Captain James Walker, M.B., from the 1st Lowland Field Ambulance, to be Captain, dated May 26, 1911.

Joseph Bernard Dawson to be Lieutenant, June 17, 1911.

Percy Reginald Bolus, M.B., to be Lieutenant, dated June 1, 1911.

Major James Malpas resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated July 8, 1911.

George Bell Brand, M.B., to be Lieutenant, dated May 15, 1911.

The King has been graciously pleased to confer the Territorial Decoration upon Major David Robert Oswald, M.B., retired list.

THE 1st NORTHERN GENERAL HOSPITAL TERRITORIALS AT CONNAUGHT HOSPITAL, NORTH CAMP.

Staff-Serjeant S. Nicholas, R.A.M.C., T.F., writes :—

"The annual training of this unit this year has been carried out at the Connaught Hospital. Since their arrival early on the morning of Sunday, June 11, enthusiasm marked the manner in which the men devoted themselves to their respective duties. In the mornings, after the 6 o'clock parade, some time was devoted to company drill, tent pitching, and striking, &c., but for the remainder of the day hospital work claimed chief attention. Most of the men have previously passed through special courses in their particular duties as cooks, nursing orderlies, hospital stewards, operating room attendants, skiagraphists, &c., in all of which the Newcastle men have taken a very deep interest, and under the guidance of Serjeant-Major Roberts and Serjeant-Major Grenfell, and also of the Matron and Sisters of the Queen Alexandra Imperial Military Nursing Service, who are taking great interest in the instruction of the men, they are becoming highly efficient, each in his own sphere of duty.

"During the second week a visit was paid by Colonel Blandford, Principal Medical Officer of the Northern district. He inspected, first of all, the encampment of the men, and was thoroughly impressed by the spick and span manner in which he found not only the lines and tents, but the interiors. Afterwards he visited the men individually at their duties in the various wards and departments, and inspected them upon the work upon which he found them engaged, and here again Colonel Blandford was entirely pleased with the manner in which the non-commissioned officers and men discharged their duties.

"The value of the training which the men are now undergoing is of considerable practical utility, even in their ordinary occupation. Hailing, as they do, from the large important manufacturing and industrial district of Tyneside, a knowledge of ambulance and hospital work renders them useful and capable citizens for the welfare of their fellow men and for the Empire.

"The social element has not been lost sight of either, and the highest spirit of comradeship exists between the regular Royal Army Medical Corps men and the Territorials. On Saturday, June 17, a brake party was arranged to drive through Guildford to Salford, and the Northerners were shown some of Surrey's prettiest country. Here an impromptu picnic and sports for the junior natives was arranged and carried out to the intense delight of both promoters and partakers. Afterwards the party retired to the village hostelry, where they had previously had tea, and indulged in a rousing sing-song. Similar picnics and entertainments have been the order of the day in the men's leisure time, and the final one, which took place on the following Friday night at the "Tumble Down Dick" Assembly Rooms, Farnborough, will long be remembered by all present, where the men said goodbye to their friends of a fortnight's acquaintance.

"The General Hospital left North Camp on Saturday morning, with the only regret that the stay had been so short."

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurse: Miss A. M. Rice, Miss G. E. Vernon, Miss E. Bulfin, Miss A. G. Dempster, Miss E. M. Long.

Postings and Transfers.—Matrons: Miss G. E. Larner, to Dublin, from London. Sisters: Miss A. Rowe, to Dublin, from Cosham; Miss A. F. Byers, to London, from Dublin, Miss K. M. Bulman, to Dublin, from Aldershot; Miss C. Anderson, to Aldershot, from Dublin. Staff Nurses: Miss E. Schafer, to Netley, from Woolwich; Miss A. M. Rice, to Tidworth, on appointment; Miss E. Bulfin, to London, on appointment; Miss A. G. Dempster, to Aldershot, on appointment; Miss A. M. Ahern, to Aldershot, on appointment, Miss M. Linaker, to Colchester, from Aldershot; Miss M. J. Branson, to Cork, from London; Miss M. E. Davis, to Devonport, from Aldershot; Miss I. Harley, to Aldershot, from Netley; Miss O. F. Stinton, to Netley, from Aldershot; Miss M. Clayden, to Netley, from London; Miss G. Hughes, to London, from Netley; Miss M. A. Rowe, to Dublin, from Devonport; Miss B. M. Nye, to Egypt, from Tidworth; Miss S. W. Wooler, to Egypt from Netley; Miss E. R. Collins, to Cairo, on arrival in Egypt.

Appointments Confirmed.—Staff Nurses: Miss E. Griffiths, Miss L. E. James, Miss D. J. Macgregor, Miss F. M. Moore, Miss V. S. Newman, Miss M. L. Scott, Miss I. J. Taunton.

Promotions.—The undermentioned Matron to be Principal Matron: Miss S. E. Oram, R.R.C. The undermentioned Sisters to be Matrons: Miss G. E. Larner, Miss S. Lamming.

ROYAL ARMY MEDICAL COLLEGE.

EXAMINATION OF CAPTAINS FOR PROMOTION TO MAJOR.

List of Subjects for Essays.—Tuesday, July 18, 1911. From 10 a.m. to 1 p.m [N.B.—One subject only to be selected.]

Medical.

(1) Discuss the diagnosis and treatment of lobar pneumonia.

(2) Contrast the signs and symptoms attending cardiac failure in mitral regurgitation and mitral stenosis.

(3) Discuss the diagnosis and treatment of duodenal ulcer.

Tropical Medicine.

(1) Discuss the various ways in which tropical heat acts as a factor in disease causation, and describe the modifications which are produced in the course of diseases by the exposure of patients to a high external temperature.

(2) Describe the method of spread, symptoms, differential diagnosis and treatment of Malta fever.

Surgical.

(1) Write an essay on the methods of causation, varieties, symptoms and treatment of fracture of the skull.

(2) Write an essay on injuries of the pelvis, other than gunshot wounds, describing the complications and treatment.

(3) Discuss the symptoms and differential diagnosis of the various conditions causing acute abdominal crises or emergencies.

(4) Discuss the pathology, differential diagnosis, and treatment of sarcomata of the upper end of the tibia.

Medicine (Written).—Tuesday, July 18, 1911. From 2.30 to 5.30 p.m.

(1) Describe the symptoms, physical signs and complications of measles; and discuss the differential diagnosis between it and syphilis.

(2) Describe the symptoms and physical signs of a perforated gastric ulcer; and discuss the differential diagnosis.

(3) Discuss the treatment and pathology of cardiac derangements occurring in young soldiers. [This question is not intended to include any form of acute endocarditis.]

(4) Describe the symptoms and physical signs of a transverse myelitis in the mid-dorsal region.

(5) Describe briefly the various blood changes which are found in typhoid fever, and which are of practical value in diagnosis and prognosis.

Surgery (Written).—Wednesday, July 19, 1911. From 10 a.m. to 1 p.m.

(1) Describe the signs and symptoms which would lead you to open the abdomen of a man aged 30, who had appeared to be in his usual health until six hours previously. What conditions would you expect to find, and how would you treat them?

(2) Describe the pathological changes which lead to extravasation of urine following upon stricture of the urethra, and indicate the lines of treatment to be adopted

(3) Discuss the pathology of surgical shock and the means which should be taken (*a*) to lessen it, and (*b*) to treat it after a severe operation.

Military Surgery and Refraction and Skiagraphy (Written).—(As part of the Examination in Surgery). Wednesday, July 19, 1911. From 2.30 to 5.30 p.m.

Military Surgery.

(1) Give the clinical course, prognosis and treatment of penetrating gunshot wounds of the abdomen involving the large intestine only.

(2) What varieties of lesion are found in gunshot wounds of peripheral nerves? Give their diagnosis, prognosis and treatment.

Skiagraphy.

(3) What sources of electrical energy are available in skiagraphy? State the advantages and disadvantages of each source, and indicate which, in your opinion, is best adapted for use on field service.

(4) What factors determine the resistance of an X-ray tube? How may the resistance be measured and varied, and what effect has the resistance upon the quality of X-rays produced?

Refraction.

(5) What is the standard of vision required for a candidate for a commission? How is the vision tested, and upon what principles is the test founded?

BALANCE SHEET.

LIABILITIES.	£	s.	d.
To Publishers' Bill for June Quarter, 1911	331	2	7
,, Balance Credit	2,093	18	11
	£2,430	1	6

ASSETS.				£	s.	d.
By Cash at Bank				529	19	2
,, Value of Stamps in Hand				0	13	4
,, Investments at Cost—						
India Stock..	£979	8	0			
Consols	568	7	3			
Do. Purchased Nov. 5, 1910	238	6	6			
				1,786	1	9
,, Furniture, &c., as per last Balance Sheet	35	9	9			
,, Do. Purchased during year ..	1	15	0			
	37	4	9			
,, *Less* 10 per cent. written off for depreciation	3	14	6			
				33	10	3
,, Outstanding for Subscriptions				9	0	0
Do Reprints				2	14	6
Do. Advertisements				68	2	6
				£2,430	1	6

TRADING ACCOUNT.

FROM JULY 1, 1910, TO JUNE 30, 1911.

EXPENDITURE.	£	s.	d.
To Publishers' Bills—			
Journals	1,106	1	3
Corps News	176	11	5
Distribution List	29	8	4
Seniority Roll	20	15	6
Reprints	11	7	1
Stationery, Postages and Packing	71	2	2
Sundries	5	6	1
Balance to Profit and Loss Account	414	1	11
	£1,834	13	10

RECEIPTS.		£ s. d.	£ s. d.
By Subscriptions to Journal		1,200 3 0	
,, ,, Outstanding June 30. 1911		9 0 0	
		1,209 3 0	
,, Deduct Subscriptions credited in error	£5 11 0		
,, Deduct Subscriptions Outstanding June 30. 1910	8 0 0		
		13 11 0	
			1,195 12 0
,, Subscriptions to Corps News			33 8 8
,, ,, Seniority Roll			25 2 3
,, Receipts for Reprints		9 1 4	
,, Amount Outstanding for Reprints June 30, 1911		2 14 6	
		11 15 10	
,, *Less* Amount Outstanding for Reprints June 30, 1910		0 8 9	
			11 7 1
,, Advertisements			283 10 0
,, Sales through Manager			5 11 6
,, ,, ,, Publishers			280 2 4
			£1,834 13 10

PROFIT AND LOSS ACCOUNT.

Expenditure.

	£	s.	d.	£	s.	d.
To Business Manager's Account—						
Stamps. Purchase of Back Numbers, &c.	16	12	9			
Clerk to Manager	24	0	0			
,, Editor	12	12	0			
Postman	0	10	0			
Addressograph	0	3	6			
Eyelet Punch	0	5	9			
				54	4	0
Honorarium to Editor..				100	0	0
,, Assistant Editor				50	0	0
,, Clerk in Record Office				6	10	0
,, Auditor				2	2	0
Exchange on Drafts				0	2	9
Depreciation of Furniture, &c.				3	14	6
Purchase of Back Numbers				0	10	4
Balance carried to Balance Sheet—						
Net Profit during the year ..	251	12	6			
Balance, July 1, 1910	1,847	6	5			
				2,098	18	11
				£2,316	2	6

Receipts.

	£	s.	d.
By Balance from last Account	1,847	6	5
Gross Profit on Trading Account	414	1	11
Interest on India Stock	32	19	0
,, Consols	20	0	2
Furniture purchased during year	1	15	0
	£2,316	2	6

July 14, 1911.
B. H. SCOTT, *Major R.A.M.C.*
Hon. Manager Journal R.A.M.C.

Examined and found correct.
EDMOND T. GANN.

ROYAL ARMY MEDICAL COLLEGE.

List of Books added to the Library during the Months of April, May and June, 1911.

Title of Work and Author	Edition	Date	Source obtained
Course of Lectures on Army Sanitation. By Lieutenant-Colonel C. H. Melville, M.B., C.M., D.P.H., R.A.M.C.	..	1911	Presented by the author.
Landmarks and Surface Markings of the Human Body. By L. B. Rawling	4th	1911	Editor, Journal.
Enlargement of the Prostate; its Treatment and Radical Cure. By C. Mansell Moullin	4th	1911	,, ,,
The Life-History, Function, and Inflammation of the Appendix. By E. M. Corner	..	1911	,, ,,
Urinary Surgery. By Frank Kidd	..	1910	,, ,,
Aids to Pathology. By Harry Campbell	2nd	1911	,, ,,
Thirty-Ninth Report of the Local Government Board, 1909-10. Supplement containing the Report of the Medical Officer, 1909-10	..	1910	,, ,,
Sprains and Allied Injuries of Joints. By R. H. A. Whitelocke	2nd	1910	,, ,,
Wounds in War, the Mechanism of their Production and their Treatment. By Colonel W. F. Stevenson, C.B., K.H.S.	3rd	1910	,, ,,
Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India—			
No. 41—Quinine and its Salts, their Solubility and Absorbility. By Captain A. C. MacGilchrist, I.M.S.	..	1911	Superintendent Government Printing, India.
No. 42—Part I. The Cultivation of the Bacillus of Leprosy and the Treatment of Cases by Means of a Vaccine prepared from the Cultivations. By Major E. R. Ross, I.M.S.			
Part 2. The Cultivation of the Leprosy Bacillus. By Captain S. S. B. Williams, I.M.S.	..	1911	,, ,,
"606" in Theory and Practice. By Ehrlich and McDonagh	..	1911	Editor, Journal.
The Treatment of Syphilis with Salvarsan. By Wechselmann and Ehrlich	..	1911	,, ,,
Military Report on the Colony and Protectorate of Sierra Leone, 1910. Vol. ii. Routes	..	1911	War Office.
Meat and Food Inspectors' Examinations. By Billing and Walker	..	1911	Editor, Journal.
A Manual of Physiology. By G. N. Stewart ..	6th	1910	,, ,,
Report on Army Manœuvres, 1910	..	1911	War Office.
Modern Surgical Technique in its Relation to Operations and Wound Treatment. By C. Yelverton Pearson	2nd	1911	Editor, Journal.
Manual for Cadets of the O. T. C. Junior Division. Compiled by Captain G. T. Hankin	2nd	1911	,, ,,
Report on Manœuvres for the Training of Royal Army Medical Corps Units held in the Southern Command, August 22 to 24, 1910. Directed by Major-General Sir H. S. Rawlinson, Bart., C.V.O., C.B.	..	1911	War Office.
A Handbook of the Tsetse-Flies (Genus *Glossina*). By E. E. Austen	..	1911	Editor, Journal.

LIST OF BOOKS ADDED TO LIBRARY.—*Continued.*

Title of Work and Author	Edition	Date	Source obtained
Consumption, its Prevention and Treatment. By E. W. Diver	..	1911	Editor, Journal.
The Geology of Water-Supply. By H. B. Woodward, F.R.S.	..	1910	Library Grant.
Text-Book of Operative Surgery. By T. Kocher. Third English Edition. Translated by Stiles and Paul	3rd	1911	,, ,,
Diseases of Occupation. By T. Oliver	New	1909	,, ,,
Handbook of the Surgery of the Kidneys. By W. Bruce Clarke	..	1911	,, ,,
Physiography for Schools. By R. D. Salisbury ..	..	1909	,, ,,
A System of Medicine. By Many Writers. Edited by Allbutt and Rolleston. Vol viii.	2nd	1910	,, ,,
Technical Mycology, the Utilization of Micro-Organisms in the Arts and Manufactures. Vol. ii. By F. Lafar. Translated by T. C. Salter	..	1911	,, ,,
Allen's Commercial Organic Analysis. Fourth Edition. Vol. iii. Edited by Davis and Sadtler	4th	1910	,, ,,
Salvarsan or "606," its Chemistry, Pharmacy and Therapeutics. By Martindale and Westcott	..	1911	,, ,,
Yellow Fever and its Prevention By Sir R. W. Boyce, F.R.S.	..	1911	Editor, Journal.
Meteorology, Practical and Applied. By Sir John Moore, M.A.	..	1910	Library Grant.
Traité d'Hygiène Militaire. Par G. H. Lemoine ..	..	1911	,, ,,
Handbook of the Medical Services of Foreign Armies. Part 5. Italy	..	1911	War Office.
Der Ursprung der Syphilis. 2 Abt. Von Dr. Med. Iwan Bloch	..	1911	Library Grant.
Reports from the Laboratory of the Royal College of Physicians, Edinburgh. Edited by Sir John Batty Tuke, M.D., and James Ritchie, M.D. Vols. x and xi	..	1911	Presented by the Royal College of Physicians, Edinburgh
The Medical Annual, 1911	..	1911	Editor, Journal.
Reminiscences of Scutari Hospital in Winter, 1854-55	..	1898	Library Grant.
Surgery of the Diseases of the Appendix. By Battle and Corner	2nd	1910	Editor, Journal.
A Clinical Atlas of Sectional and Topographical Anatomy. By R. J. A. Berry, M.D.	..	1911	,, ,,
The British Sanatoria Annual..	..	1911	,, ,,
The Metabolism and Energy Transformations of Healthy Man during Rest. By Benedict and Carpenter	..	1910	Library Grant.
St. Thomas's Hospital Reports. New Series. Vol. xxxviii. 1909	..	1911	Editor, Journal.

THE ARMY MEDICAL OFFICERS' WIDOWS AND ORPHANS FUND.

NEW Rules having been adopted in 1906, the attention of officers of the Corps who wish to make some provision for their widows and orphans on the most advantageous terms is invited to the benefits now offered by the above Fund, of which the strong financial position will be seen from the valuation balance sheet below.

Under these rules, owing to the large accumulated fund, and economical management on mutual principles, an officer can provide an annuity for his widow and orphans at a very moderate annual outlay.

The benefit provided by the Society to the subscriber's widow, under his marriage subsisting at the date of commencement of his subscription as a married member, is £50 per annum during widowhood, with the continuance of the annuity, during re-marriage of the widow or after her death, to the child or children of the said marriage until such child, or the youngest of such children, shall have attained the age of 21 years. Furthermore, should the wife of the subscriber pre-decease him, it will be optional for him to continue until his death the subscription he had been paying as a married member, in order to provide an annuity similar to the above for the children of the marriage, until the youngest shall have attained the age of 21 years.

In addition to the above benefits, provision is made (Rule X) whereby the surplus at any quinquennial valuation may be applied for the benefit of members, or their widows, or orphan children. Thus at the recent valuation, as at December 31, 1910, the sum of £8,815 was appropriated for division, to provide :—

(1) An addition of 4 per cent. to all annuity benefits, immediate or contingent, in respect of members *on the books on December* 31, 1910, which will bring the £50 annuity benefits up to the present statutory limit of £52 per annum.

(2) A sum of £100 to be paid at the death of every first-class married member *on the books at December* 31, 1910, should he pre-decease his present wife, and to be in addition to the sum then payable as the first half-yearly annuity payment.

(3) To the widow of each second-class married member *on the books at December* 31, 1910, a sum of £50 to be paid at the death of a member, should he pre-decease his present wife, and to be in addition to the sum then payable as the first half-yearly annuity payment.

There is every reason to hope that similar additional benefits may, at the next quinquennial valuation, be granted to members now joining.

In order to safeguard the interests of existing members the Committee are now empowered, on the imminence or outbreak of war, to postpone consideration of applications for membership, or to charge extra rates to cover war risks.

The Rules, Actuary's Report, Declaration Forms, and other information about the Fund can be obtained from the Secretary, Captain J. T. Clapham, 20, Belgrave Road, S.W.

ARMY MEDICAL OFFICERS' WIDOWS AND ORPHANS FUND.

Valuation Balance Sheet, as at December 31, 1910.

Dr.	£	*s.*	*d.*	*Cr.*	£	*s.*	*d.*
To present value of Immediate Annuities to 75 Widows	36,420	0	0	By Amount of Funds ..	134,194	0	0
,, Present value of Contingent Annuities to the Widows (or Orphans) of Married Members..	41,512	0	0	,, Value of future Subscriptions of Married Members	19,338	0	0
,, Present value of Contingent Annuities to the future Wives (or future Orphans) of Unmarried Members ..	542	0	0	,, Value of Subscriptions of Unmarried Members who entered before January 1, 1906 ..	146	0	0
,, Reserve for Unhealthy Climate and War Risks	5,000	0	0				
,, Reserve for Management Expenses ..	5,877	0	0				
,, Net Surplus	64,322	0	0				
Total ..	£153,673	0	0	Total ..	£153,673	0	0

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON WEDNESDAY, JULY 19, 1911, AT 3 P.M.

Present.

Surgeon-General W. Donovan, C.B., Vice-President, in the Chair.
Colonel E. J. Risk.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
The Secretary.

(1) The Minutes of the last Meeting were read and confirmed.

(2) It was noted that a donation of £5 5s. has been received from Surgeon-General Sir J. A. Woolfreys, K.C.B., C.M.G.

(3) It was resolved under Rule 10 which reads as follows: "The funded property of the Society is to be considered inviolate. The annual interest thereof, together with such proportion of the donations and subscriptions as the Committee may suggest, and the General Meeting sanction, is to be distributed annually. All surplus receipts are to be forthwith added to the funded stock of the Society." That a sum not exceeding £225 is to be invested in Consols.

(4) The Secretary read a letter from Miss B. M., and stated the grounds on which he refused her a grant, which the Committee fully approved.

(5) The Secretary reported to the Committee the correspondence he has had with reference to the grant made to Mrs. C.

(6) Surgeon-General Donovan gave notice that at the next Meeting he will bring forward a proposal to admit the orphans of Quartermasters of the Royal Army Medical Corps to the benefits of the Society.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*
Secretary.

July 19, 1911.

ROYAL ARMY MEDICAL CORPS FUND.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON WEDNESDAY, JULY 19, 1911, AT 2.30 P.M.

Present.

Surgeon-General W. Babtie, V.C., C.M.G., in the Chair.
Surgeon-General W. Donovan, C.B.
Colonel E. J. Risk.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Lieutenant-Colonel E. O. Wight.
Major A. Bruce.
Captain G. G. Delap, D.S.O.
Captain L. Cotterill.

(1) The Minutes of the last Meeting were read and confirmed.

(2) It was noted that the following grants were received from Companies for the General Relief Fund during the last quarter:—

Nos. 13 and 34 Companies, Woolwich	£5	0	0
,, 10 ,, ,, Chatham	2	0	0
,, 14 ,, ,, Dublin	7	10	0
,, 30 ,, ,, Malta	10	0	0
	£24	10	0

(3) The Grants made from the General Relief Fund for the quarter ending June 30, 1911, were confirmed as follows :—

Name	Age	District	Grant	Total	Remarks
Mr. R. P.	39	Aldershot	£4	£4	Ill-health. Out of work. Seven children.
Mrs. M. S.	40	,,	£4	£12	Help to support family.
Mrs. A. L.	30	London	£4	£6	Suffers from ill-health. One child to support.
Mr. C. L.	35	Eastbourne	£2	£2	Out of work.
Mrs. L. P.	34	Aldershot	£4	£16	Special grant by Committee of £4
Mr. W. R.	38	York	£2	£2	Destitute. Out of work.
Mrs. P.	44	Portsmouth	£3	£15	Suffers from ill-health.
Mrs. K. B.	33	London	£1	£3	Out of work. No means.
Mr. G. P.	73	Preston	£4	£4	Too old to work.
Mrs. G. R. S.	32	Portsmouth	£3	£3	No means.
Mr. A. T.	39	London	£1	£1	Destitute. Out of work.
Mr. H. S. G.	44	,,	£1	£1	Destitute. Out of work.
Mrs. A. E. B.	25	Salisbury	£3	£3	No means; husband has disappeared.
Mrs. M. A. H.	69	Colchester	£4	£8	Suffers from chronic rheumatism. Unable to work.
Mrs. A. J. MacD.	46	Portsmouth	£4	£4	Unable to work from ill-health.
Mrs. A. L.	52	Belfast	£4	£18	Nearly blind. Unable to work.
Mrs. A. L.	50	Cork	£4	£32	Ill-health ; poverty.
Mrs. M. C.	38	Dover	£4	£4	In distressed circumstances.
Mr. J. H.	38	Western	£3	£3	Out of work. Ill-health.

(4) The Aldershot Band accounts were considered and passed, and are appended to these proceedings. A grant of £95 was made towards the current quarter's expenses.

(3) Captain Cotterill, the Band President, read a letter from the Officer Commanding the Depot to the Principal Medical Officer, Aldershot, asking that he would recommend the Committee of the Royal Army Medical Corps Fund to give a donation of £10 as a special case, towards the expenses of the Band's outing ; after some discussion, it was resolved that a special donation of £10 should be given for this year only, as a mark of appreciation by the Committee of the general improvement of the Band.

(5) The following members of the Committee were appointed to serve on the Memorial Sub-Committee :—

Surgeon-General W. Babtie, V.C., C M.G.
Colonel E. J. Risk.
Lieutenant-Colonel E. O. Wight.

(6) Two applications for the admission of children to the Royal Soldiers' Daughters' Home were considered. It was resolved that the child of Corporal A. F. K. should be sent to the Home as a boarder and paid for from the General Relief Fund, the father having promised to pay the sum of sixpence a day towards the child's maintenance there. With regard to the orphan daughter of the late Quartermaster Serjeant James W., it was resolved that the application be not approved.

(7) It was noted that a sum of £275 8s. was paid from the Corps Fund towards the expenses of the Dinner.

(8) As it is considered that the application forms for grants from the General Relief Fund are obsolete, the Secretary was directed to get new forms printed, and to obtain a proof for the consideration of the next Committee meeting.

(9) A letter was read from Major J. V. Forrest calling attention to the condition of some of the graves at the cemetery at Scutari. The Secretary was directed to inform Major Forrest that the graves are maintained by the Board of Works.

(10) An annual subscription of £5 was sanctioned for the Drummond Institute.

(11) Major Bruce brought before the notice of the Committee the fact that there is not, at present, any fund from which the orphans of Quartermasters can be assisted.

STATEMENT OF THE ROYAL ARMY MEDICAL CORPS BAND ACCOUNTS.

For Quarter ending June 30, 1911.

RECEIPTS.	£	s.	d.
Balance Credit brought forward	0	7	8½
Officers' Subscriptions (Aldershot)	17	0	0
Secretary R.A.M.C. Fund (Quarterly Grant)	95	0	0
Thirty-nine Officers' Subscriptions	9	15	0
Fares and Gratuities recovered from last Quarter	5	2	5
Advanced by O.C. "C" Company	1	0	0
By Cheque Petty Cash	5	0	0
	£131	5	1½

EXPENDITURE.				£	s.	d.
Bandmaster's Salary				30	0	0
Expenses to Opera (twice)				1	0	0
,, London (tailor)				0	3	6
Band Pay				52	12	3
Hawkes and Son (Serjt.-Drummer's sash)				9	6	0
Boosey and Co. (new music-stands)				14	0	0
Refund, Two Officers' Subscriptions				0	10	0
Electric Light Charge				0	18	0
Repairs				0	1	6
Postage				0	9	1
Advanced for Engagements				6	19	2
Petty Cash				3	0	0
Balance Credit—						
In Hand	0	10	5½			
Bank	11	11	2			
				12	1	7½
				£131	5	1½

LEONARD COTTERILL, *Captain*,
Band President, *R.A.M.C.*

Estimate for Quarter ending September 30, 1911.

	£	s.	d.
Balance Credit	0	10	5½
Estimated Aldershot Subscriptions	16	17	6
Probable Grant required	93	1	4½
	£110	9	4

	£	s.	d.
Estimated expenditure under all heads	110	9	4
	£110	9	4

Audited and found correct. (*Signed*) N. H. ROSS, *Major*.

He stated that the Quartermasters would consider it derogatory to be relieved from the General Relief Fund. The Chairman stated that this matter had been under consideration for some time, and it was hoped that some arrangements would be made in the near future whereby the destitute orphans of Quartermasters will be enabled to get some relief.

F. W. H. Davie Harris,
Lieutenant-Colonel, Secretary.

THE BRITISH RED CROSS SOCIETY.

The Empress Marie Féodorovna Fund.

The above Fund was founded during the Seventh International Red Cross Conference, held at St. Petersburg, in 1902, by Her Imperial Majesty the Empress Marie Féodorovna, the August Protectress of the Russian Red Cross Society, for the purpose of awarding prizes to the authors of the best inventions, having for their object the diminution of the sufferings of the sick and wounded in time of war, in accordance with the conditions promulgated in the subjoined statutes of the Fund.

Her Majesty gave 100,000 roubles to create the Fund, with the proviso that the interest accruing thereon should be distributed for the above objects upon the results of an International Competition to be held every five years.

The first competition for the prizes offered from the Fund was held in London in 1907 in connection with the Eighth International Red Cross Conference organized by the British Red Cross Society. The prizes awarded at that competition amounted to about £2,000.

In conformity with the statutes of the Empress Marie Féodorovna Fund arrangements have been made by the American National Red Cross to hold the next competition concurrently with the Ninth International Red Cross Conference, which will assemble at Washington, D.C., from May 7 to 17, 1912.

The Central Committee of the Russian Red Cross Society announce that the subjects selected for the next (second) competition, and for which a sum of 18,000 roubles is available as prizes to be awarded by the International Jury, are as follows :—

1 First Prize of 6,000 roubles.
2 Second Prizes of 3,000 roubles each.
6 Third Prizes of 1,000 roubles each.

Programme.

(1) A scheme for the removal of wounded from the battlefield with the minimum number of stretcher bearers.

(2) Portable washstands for use in the field.

(3) The best way of carrying dressings for use in regimental aid posts and dressing stations.

(4) Wheeled stretchers.

(5) Transport of stretchers on mule back.

(6) Easily folding portable stretcher.

(7) Transport of the wounded between war-ships and hospital ships and the coast.

(8) The best method of heating railway carriages by a system independent of steam from the engine.

(9) The best model of portable Röntgen Apparatus for the employment of X rays at the dressing stations on the field of battle.

Statutes of the "Empress Marie Féodorovna" International Red Cross Fund.

(1) The "Empress Marie Féodorovna" International Fund of the Red Cross was established for the purpose of awarding prizes to the authors of the best inventions for alleviating the sufferings of sick and wounded soldiers.

(2) The Fund consists of 100,000 roubles, which Her Majesty, The Empress Marie Féodorovna, the August Protectress of the Russian Red Cross Society, has been graciously pleased to give for this purpose.

(3) The capital of the Fund is to remain intact.

(4) The interest on the capital shall be used for the purpose of awarding prizes to the authors of the best inventions in any one of the following subjects: Searching for and rescuing sick and wounded on the battlefield; the most rapid and comfortable means of transporting sick and wounded to the nearest regimental aid post and for their ultimate evacuation; generally for the best ways and means of helping sick and wounded either on the battlefield or in rear of the army.

(5) The care of the Fund and its administration is vested in the Executive Committee of the Russian Red Cross Society.

(6) The date of distribution of prizes, the subjects for which they will be awarded (within the scope mentioned in Article 4), the number and amount of prizes, as well as the other details of the competitions, will be fixed at each International Red Cross Conference; this decision will remain in force until the succeeding Conference.

The interval between two successive distributions must not be less than five years.

(7) Only new inventions will be admitted to the competitions for prizes that is to say, those whose descriptions have not been published before the competition which precedes that at which the invention is presented.

(8) In awarding the prizes preference will be given to the inventions which are likely to be of most practical use, and of which the utility has been thoroughly demonstrated by models shown at the competition.

(9) Inventions sent in for the prize competition must be submitted exclusively through the Central Red Cross Committee of each country; these Committees have the right to refuse to admit an invention to the competition. All expenses attaching thereto must be defrayed by the person or Committee presenting the invention.

(10) In case a Red Cross Exhibition is organized simultaneously with, and in the same town as the competition, the inventions competing for these prizes must be exhibited as a special section of the exhibition and at the cost of the persons and institutions which present them.

(11) The awarding of prizes is carried out by a Special International Jury, composed of eight members, two of whom are permanent and are elected, one by the Executive Committee of the Russian Red Cross Society and the other by the International Red Cross Committee. The other six members are elected by the Central Red Cross Committees of the other countries.

(12) The Seventh International Red Cross Conference designated six Central Red Cross Committees, whose representatives formed part of the Jury at the first distribution of the prizes, which took place in 1907. In order to permit all the Central Committees of each country being successively represented on the Jury in future, at each new Conference lots will be drawn by representatives of all the Committees which took part in the last award of prizes, to determine two Committees, the representatives of which shall retire and be replaced by the representatives of two other Committees elected by the Conference. The Jury itself elects its President, who directs the work of the Jury, and on completion forwards all papers and decisions of the Jury, as well as all drawings and descriptions presented to it, to the Executive Committee of the Russian Red Cross Society, which delivers the diplomas and prizes.

(13) The sums available from the Fund must only be used for the award of prizes, and for expenses having a direct connection with the work of the Jury, such as the transfer of money, the preparation of diplomas, &c., the cost of transport of exhibits, and the expenses necessitated by the care of these objects, their exhibition, &c., any other expenses not having a direct reference to the work of the Jury are not to be paid out of the Fund.

(14) If the Jury is not satisfied with the results of the competition, it has the right to withhold any part of the sum at its disposal for the awarding of prizes. The balance remaining undistributed will be used to augment the number and amount of the prizes to be awarded at the next competition.

(15) The Central Red Cross Committee of each country must undertake to give the greatest possible publicity to the competitions and their programmes.

(16) Changes in the appropriation of the Fund or in the text of the actual Statutes cannot be effected except in virtue of decisions of the International Red Cross Conference, with the approbation of the August Protectress of the Russian Red Cross Society.

FRANK HASTINGS,
Secretary.

9, *Victoria Street, London, S.W.*

BIRTHS.

GOLDSMITH.—On July 2, at 88, Lower Baggot Street, Dublin, to Major and Mrs. G. M. Goldsmith, a son.

SWABEY.—On June 21, at Wellington, Nilgiris, India, the wife of Major M. Swabey, R.A.M.C., of a daughter.

DEATH.

KIRKPATRICK.—At Southsea, on June 29, 1911, Lieutenant-Colonel Hugh Cunningham Kirkpatrick, M.D., Retired Pay, late Royal Army Medical Corps, aged 59. He entered the Service as a Surgeon, Army Medical Department, on August 5, 1877, became Surgeon-Major August 5, 1889; Surgeon-Lieutenant-Colonel, Army Medical Staff, August 5, 1897; Lieutenant-Colonel, Royal Army Medical Corps, with increased pay, July 14, 1900, and was placed on retired pay on October 8, 1906. His war service was: Afghan War, 1879-80, with Kabul Field Force; Medal.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, *Serle Street, London, W.C., not later than the* 22*nd of the month.*

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	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	3	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Captain W. R. O'Farrell, Dr. A. Balfour, Colonel R. H. Firth, Major H. W. Grattan, Captain J. L. Wood, Captain E. V. Aylen, Lieutenant-Colonel H. D. Rowan, Captain P. S. Lelean, Major W. S. Harrison, Major S. H. Fairrie, Captain A. B. Smallman, Major F. Harvey, Major Beveridge.

The following publications have been received:—

British: The Cavalry Journal, The Quarterly Journal of Medicine, Journal of the Royal Institute of Public Health, Transactions of the Society of Tropical Medicine and Hygiene, The Middlesex Hospital Journal, Medical Press and Circular, The Lancet, N.R.A. Journal, The Indian Medical Journal, The Hospital, Journal of the Royal United Service Institution, Guy's Hospital Gazette, Army and Navy Gazette, The British Journal of Tuberculosis, St. Thomas' Hospital Reports, 1909, *Paludism* (No 2), *The Royal Engineers' Journal, The Australasian Medical Gazette, The Journal of Tropical Medicine and Hygiene, The Journal of Meat and Milk Hygiene* (Nos. 5 and 6), *The Journal of Tropical Veterinary Science, St. Thomas' Hospital Gazette, The Public Health Journal* (*Canada*), *The Commonwealth Military Journal, Proceedings of the Royal Society of Medicine, The Practitioner, The Army Service Corps Quarterly, The Medical Review, Red Cross and Ambulance News, Public Health.*

Foreign: Office International d'Hygiène Publique, Proceedings of the Canal Zone Medical Association, Russian Naval Medical Journal, Militaerlaeger, Norsk Tidsskrift for Militaermedicin, Annali di Medecina Navale e Coloniale, Bulletin of the Johns Hopkins Hospital, Le Caducée, Rivista de Sanidad Militar, The Cleveland Medical Journal, Bulletin de l'Institut Pasteur, Archives de Médecine et Pharmacie Navales, Deutsche Militärärztliche Zeitschrift, Paris Médical, Archiv für Schiffs- und Tropen-Hygiene, The Military Surgeon, Archives de Médecine et de Pharmacie Militaires, United States Department of Agriculture, American Medicine, Annales d'Hygiène et de Médecine Coloniales, Pathologica, A Report on Hæmoglobinuric Fever in the Canal Zone.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

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"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"
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JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

SEPTEMBER, 1911.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Lieutenant-Colonels retire on retired pay:—Sir Joseph Fayrer, Bart., M.D., dated July 29, 1911; Thomas H. F. Clarkson, July 29, 1911; Daniel Hennessy, M.D., dated August 2, 1911; David M. Saunders, M.D., dated July 29, 1911; Herbert W. Austin, dated July 29, 1911. All of the above Officers entered the service as Surgeons, Medical Staff, on July 28, 1886, became Majors, Royal Army Medical Corps, on July 28, 1898, and Lieutenant-Colonels on July 28, 1906. Their war service is as follows:—

Lieutenant-Colonel T. H. F. Clarkson, Nile Expedition, 1898. Battle of Khartoum, Egyptian medal with clasp, medal.

Lieutenant-Colonel D. Hennessy, Operations in Zululand, 1888.

Lieutenant-Colonel D. M. Saunders, South African War, 1899-1901. Operations in Cape Colony, south of Orange River, 1899-00. Operations in Cape Colony, November 30, 1900 to July 1901, Queen's medal with two clasps.

Lieutenant-Colonel H. W. Austin, South African War, 1900-01. Served in St. Helena. Queen's medal.

Lieutenant-Colonel George W. Brazier-Creagh, C.M.G., retires on retired pay, dated August 2, 1911. He entered the service as a Surgeon, Army Medical Department, on July 30, 1881, became Surgeon-Major, Army Medical Staff, on July 30, 1893, and Lieutenant-Colonel, Royal Army Medical Corps, on July 30, 1901. His war service is: South African War, 1899-1902. Relief of Ladysmith, including action at Colenso; operations of January 17 to 24, 1900, and action at Spion Kop; operations of February 5 to 7, 1900, and action at Vaal Kranz; operations on Tugela Heights (February 14 to 27, 1900), and action at Pieters Hill. Operations in the Transvaal in June, 1900. Operations in Natal (March to June, 1900), including action at Laings Nek (June 6 to 9). Operations in the Transvaal and Orange River Colony, January 31 to May, 1902. Operations in Orange River Colony, November to

December, 1901. Operations on the Zululand Frontier of Natal in September and October, 1901. Despatches, *London Gazette*, February 8, 1901 (Sir R. H. Buller, March 30 and November 9, 1900) and *London Gazette*, July 29, 1902. Queen's medal with six clasps. King's medal with two clasps. C.M.G.

The undermentioned Majors are placed on retired pay: Robert J. D. Hall, dated July 28, 1911; Charles E. G. Stalkartt, M.D., dated July 28, 1911; Christopher J. Healy, M.B., dated 28, 1911; Thomas J. Lenehan, M.B., dated July 28, 1911.

Major Hall entered the service as a Surgeon, Medical Staff, on July 28, 1886, and became Major, Royal Army Medical Corps, on July 28, 1898.

Majors Stalkartt, Healy and Lenehan entered the service as Surgeon-Captains, Medical Staff, on July 28, 1891, and became Majors, Royal Army Medical Corps, on July 28, 1903. Their war service is as follows:

Major Stalkartt, South African War, 1900. Operations in the Orange Free State, 1900, including operations at Paardeburg and action at Karee Siding. Queen's medal with two clasps.

Major Healy, North-west Frontier of India, 1897-8, Mohmand. Medal with clasp. Tirah, 1897-8. Operations in the Bara Valley, December 7 to 14, 1897. Clasp South African War, 1901-2—Operations in Cape Colony, July and August, 1901. Queen's medal with three clasps.

Major Lenehan, Operations in Chitral, 1895, with the Relief Force. Medal wit clasp. South African War, 1900-02—Defence of Ladysmith. Operations in the Transvaal, December, 1900 to February, 1901. Operations in Orange River Colony, June to August, 1901, and December, 1901 to February, 1902. Operations in Cape Colony, March to May, 1901. Queen's medal with four clasps. King's medal with two clasps.

Major Francis J. Wade-Brown retires on retired pay, dated July 29, 1911. He entered the service as a Surgeon-Captain, Medical Staff, on July 28, 1891, and became Major, Royal Army Medical Corps, on July 28, 1903. His war service is as follows: South African War, 1899-1902. Operations in Orange River Colony, May to November, 1900. Operations in Cape Colony, south of Orange River, November, 1899, to May, 1900. Operations in Orange River Colony, November 30, 1900, to May 31, 1902. Queen's medal with two clasps. King's medal with two clasps.

The undermentioned Majors to be Lieutenant-Colonels: Bertal H. Scott, *vice* J. R. Forrest, retired, dated June 21, 1911; Brevet Lieutenant-Colonel Oliver R. A. Julian, C.M.G., *vice* B. H. Scott, supernumerary to establishment, dated June 21, 1911; Eustace A. Burnside, *vice* H. D. E. White, retired, dated July 3, 1911; Thomas McCulloch, M.B., *vice* Sir J. Fayrer, Bt., retired, dated July 29, 1911; John Ritchie, M.B., *vice* T. H. F. Clarkson, retired, dated July 29, 1911; Stuart Macdonald, M.B., *vice* D. M. Saunders, retired, dated July 29, 1911; Maurice P. C. Holt, D.S.O., *vice* H. W. Austin, retired, dated July 29, 1911; William L. Gray, M.B., *vice* G. W. Brazier-Creagh, retired, dated August 2, 1911; Edward G. Browne, *vice* D. Hennessy, retired, dated August 2, 1911.

The undermentioned Captains to be Majors, dated July 27, 1911: William A. Woodside; Littleton F. F. Winslow; Otto W. A. Elsner; Arthur A. Seeds, M.D.; Henry S. Anderson; Langford N. LLoyd, D.S.O.; Thomas C. MacKenzie, D.S.O.; Edward P. Connolly; James H. R. Bond; Harold H. Norman.

The undermentioned Lieutenants are confirmed in their ranks: Charles M. Finny, M.B.: James D. Kidd, M.B.; William S. R. Steven, M.B.; Gordon Wilson M.B.; Edwin G. S. Cane; Francis A. Robinson, M.B.; William A. Frost, M.B.; Douglas Reynolds, M.B.; Charles D. K. Seaver; William T. Graham, M.B.; Walter Bisset, M.B.; William L. E. Fretz, M.B.; Patrick Hayes, M.B.

Lieutenant (on probation) Hugh G. Monteith (seconded under article 300 Royal Warrant) is restored to the establishment, dated July 29, 1911.

Quartermaster and Honorary Captain Henry S. Brook is placed on retired pay, dated July 18, 1911; Serjeant Major Charles Henry Cooper to be Quartermaster, with the honorary rank of Lieutenant, dated July 19, 1911.

HIGHER RATE OF PAY.—Lieutenant-Colonels F. W. C. Jones, J. Meek, and W. T. Swan, have been selected for the higher rate of pay under article 317, Royal Warrant.

ARRIVALS HOME FROM DUTY.—From West Africa: On August 1, Captain B. B. Burke.

POSTINGS.—London District: Major J. S. Gallie. The Scottish Command: Captain C. G Thomson. The Northern Command: Captains D. S. Skelton, and J. E. Powell. The Irish Command: Lieutenants C. M. Finny, J. D. Kidd, E. G. S. Cane, F. A. Robinson, D. Reynolds, C. D. K. Seaver, and Quartermaster and Honorary Lieutenant C. H. Cooper. The Eastern Command: Lieutenants W. S. R. Steven, W. Bisset and T. C. R. Archer. The Aldershot Command: Lieutenants G. Wilson, W. L. E. Fretz, and P. Hayes. The Southern Command: Lieutenants W. A. Frost, W. T. Graham and P. M. J. Brett.

TRANSFERS.—Captain F. P. Lauder, from Aldershot to the Irish Command.

TRANSFERS TO THE HOME ESTABLISHMENT.—From India on August 16, Major J. S. Gallie.

APPOINTMENTS Lieutenant-Colonel S. Hickson, Charge of the Cambridge Hospital, Aldershot; Major J. S Gallie, Medical Officer of the Tower of London; Major F. J. Brakenridge, Medical charge at Oxford; Major A. L. A. Webb, Sanitary Officer, West Africa; Captain P. Davidson, D S.O., Company Officer, Depot, Royal Army Medical Corps; Major J. F. Burke, R.P., Medical charge at Penally.

QUALIFICATIONS.—The undermentioned officers have obtained the degrees, &c., noted against their names: Major H. P. Johnson, M.D., Durham; Captain J. McKenzie, Diploma in Public Health of the Royal Colleges of Physicians and Surgeons, England; Lieutenant W. P. MacArthur, M.D., Queen's University, Belfast

ARRIVALS HOME ON LEAVE.- Lieutenant-Colonels S. C. Philson, S. G. Allen, W. H. Starr and H. B. Matthias, D.S.O.; Majors T. H. J. C. Goodwin, D.S.O.; S. A. Archer, M. H. G. Fell and T. C. MacKenzie, D.S.O.; Captains J. A. Hartigan, F. A. McCammon, V. C. Honeybourne, R. W. D. Leslie and W. R. O'Farrell.

ROSTER FOR SERVICE ABROAD.—The undermentioned exchanges of position on the Roster have been approved: Between Lieutenant-Colonels J. H. Daly and F. W. G. Gordon-Hall; Majors L. Way and A. R. O'Flaherty; Captains C. S. Smith and R. N. Woodley; A. F. Carlyon and M. F. Foulds; A. F. Weston and A. H. McN. Mitchell; A. R. Greenwood and H. T. Stack; R. V. Cowey and A. E. B. Wood: Lieutenants C. T. V. Benson and A. W. Bevis have been permitted to exchange destinations on proceeding abroad; Major C. R. Evans will proceed to Malta during the trooping season 1911-12 to replace Captain J. A. Hartigan, who will proceed to North China.

ORDER OF THE HOSPITAL OF ST. JOHN OF JERUSALEM IN ENGLAND.—The King has been graciously pleased to sanction the following promotion in, and appointment to, the Order of the Hospital of St. John of Jerusalem in England:—

As Knight of Grace: Surgeon-Lieutenant-Colonel Sir Warren Roland Crooke-Lawless, C.I.E.

As Esquire: Major Gilbert Stewart Crawford, R.A.M.C., M.D. (from Honorary Associate).

RESULTS OF EXAMINATIONS.

The undernamed Officers are reported as having passed the examination in subject (*h*) Captains, Royal Army Medical Corps, for promotion to the rank of Major, held at the Royal Army Medical College, during the class of instruction for Captains which terminated on July 31, 1911.

Rank	Name	Class	Eligible for acceleration of promotion	Selected subject	Remarks
Major	Brakenridge, F. J.	3rd	..	State medicine ..	Specialist
Captain	Black, R. B.	,,	3 months	,,	
,,	Brunskill, J. H.	,,	3 ,,	Bacteriology ..	Specialist
,,	Jones, J. L.	..	..	Ophthalmology	
,,	Hull, A. J.	2nd	6 months	Operative surgery	
,,	Davidson, P.	3rd	3 ,,	Physical training	Specialist
,,	Foster, R. L. V.	,,	3 ,,	State medicine ..	do.
,,	Meadows, S. M. W.	,,	3 ,,	Midwifery, &c. ..	do.
,,	Skelton, D. S.	2nd	6 ,,	Bacteriology ..	do.
,,	Bell, J. G.	3rd	3 ,,	Otology, &c. ..	do.
,,	Wood, A. E. B.	..	..	,,	
,,	Carmichael, J. C. G.	3rd	3 months	Bacteriology	
,,	Bridges, R. H.	,,	3 ,,	Physical training	
,,	Webster, J. A. W.	,,	3 ,,	Otology, &c.	
,,	Lambert, F. C.	,,	3 ,,	Operative surgery	
,,	Wilmot, R. C.	,,	3 ,,	Ophthalmology ..	Specialist
,,	Kelly, H. B.	,,	3 ,,	Midwifery, &c. ..	do.
,,	Pennefather, E. M.	,,	3 ,,	,,	
,,	Dunbar, B. H. V.	,,	3 ,,	State medicine	
,,	Crawford, J. M. M.	,,	3 ,,	Ophthalmology	
,,	Bramhall, C.	..	..	State medicine	
,,	Stack, H. T.	..	..	,,	
,,	Patch, B. G.	3rd	3 months	Otology, &c ..	Specialist
,,	Gray, A. C. H.	2nd	6 ,,	Bacteriology ..	do.
,,	Dudding, T. S.	3rd	3 ,,	State medicine	
,,	MacNicol, R. H.	,,	3 ,,	Dermatology ..	Specialist
,,	Fawcett, H. H. J.	2nd	6 ,,	Physical training	do.
,,	Pallant, S. L.	3rd	3 ,,	Otology, &c. ..	do.
,,	Sylvester-Bradley, C. R.	,,	3 ,,	Physical training	do.
,,	Lewis, S. E.	,,	3 ,,	Midwifery, &c. ..	do.
,,	Hanafin, P. J.	,,	3 ,,	Ophthalmology ..	do.
,,	Richmond, J. D.	2nd	6 ,,	,,	
,,	Glanvill, E. M.	,,	6 ,,	Dermatology, &c.	
,,	MacDowall, W. MacD.	..	..	,,	
,,	Wright, T. J.	3rd	3 months	,,	
,,	Whitehead, E. C.	,,	3 ,,	State medicine	
,,	Hole, R. B.	,,	3 ,,	Dermatology, &c.	
,,	Wiley, W.	,,	3 ,,	Operative surgery	
,,	Harding, H.	,,	3 ,,	Dermatology	
,,	Grant, M. F.	..	..	State medicine	
,,	Ahern, M. D.	2nd	6 months	Dermatology	
,,	Winckworth, H. C.	,,	6 ,,	Operative surgery	Specialist
,,	Buchanan, R. J. B.	,,	6 ,,	Bacteriology ..	do.
,,	Emerson, H. H. A.	..	..	,, ..	do.
,,	Rose, A. M.	..	..	State medicine	
,,	Farrant, P.	..	..	Operative surgery	
,,	Dill, M. G.	..	..	Midwifery, &c.	

LIST OF SUCCESSFUL CANDIDATES FOR COMMISSIONS IN THE ROYAL ARMY MEDICAL CORPS AT THE COMPETITION HELD IN LONDON IN JULY, 1911, FOR WHICH FORTY-FOUR CANDIDATES ENTERED.

Names	Medical School	Qualifications	Marks
*Spence, B. H. H.	Edinburgh University	M.B., Ch.B. Univ. Edin.	622·5
Laird, W. B.	St. Thomas's Hospital	M.R.C.S.Eng., L.R.C.P.Lond.	606
Bruce, D. W.	Aberdeen University	M.B., Ch.B. Univ. Aber.	568
Blackmore, H. S.	University College Hospital	M.R.C.S.Eng., L.R.C.P.Lond., L.D.S., R.C.S.Eng.	567
Calthrop, E. S.	Charing Cross Hospital	M.B., B.S., Univ. Lond., M.R.C.S.Eng., L.R.C.P. Lond.	565
Buckley, L.	Liverpool University	M.B., B.Ch., Univ. Liverpool, M.R.C.S.Eng., L.R.C.P. Lond.	564
Skrimshire, F. R. B. (Lieut. 4th Batt Hampshire Regt.)	St. Thomas's Hospital	M.R.C.S.Eng., L.R C.P.Lond.	555·5
Vivian, R. T.	St. Bartholomew's Hospital	M.R.C.S.Eng., L.R.C.P.Lond.	553
Osmond, T. E	University, Cambridge, and St. Bartholomew's Hospital	M.R.C.S.Eng., L.R.C.P.Lond., B.A.Cantab.	550
Deane, E. C.	Royal Colls. Physicians and Surgeons, Ireland	L.R.C.P. and S.Ireland, L.M. (Rotunda)	549
Sykes, S. P	Liverpool University	M.B., Ch.B Univ. Liverpool	544
Davidson, R	Dundee University	M.B., Ch.B. St. Andrew's	542
Cowen, E G H	Charing Cross Hospital	M.B., B.S. Univ. Lond., M.R.C.S.Eng., L.R.C.P. Lond.	541
Allnutt, E. B	St. Bartholomew's Hospital	M.R.C.S.Eng., L.R.C.P.Lond.	537
Elliott, J. M.	Trinity College, Dublin	M.B., B.Ch., B.A., B.A.O., Univ. Dublin, L.M. (Rotunda)	535
*Todd, H. E	Edinburgh University	M.B., Ch.B. Univ. Edin.	529
†Ritchie, J L.	Birmingham University	M.B., Ch.B. Univ. Birmingham, M.R.C.S.Eng., L R.C.P.Lond.	524·5
Drummond, M.	Univ. Coll., Dublin; St. Bart.'s Hospital	L.R.C.P. and S.Ireland, L.M. (Rotunda)	522
*MacIlwaine, A. G. J.	Queen's University, Belfast	L.R.C.P. and S.Ireland	520
Stewart, W.	Edinburgh University	M B., Ch.B. Univ. Edin.	516
Tamplin, F. S	St. George's Hospital	M.R.C S.Eng., L.R.C.P.Lond.	507
Hudleston, I. R.	Univ. Coll., Bristol; St. Bartholomew's Hosp.	M.R.C S.Eng., L.R.C.P.Lond.	504
Heale, A. S.	Otago University, N.Z.; London Hospital	M.R.C.S.Eng., L.R.C.P.Lond.	501
Wigmore, A. J. O	Univ. Coll., Bristol	M R.C.S.Eng., L.R.C.P.Lond.	501
Wells, H. J. G.	Edinburgh University	M.B., Ch.B. Univ. Edin.	500·5
Webster, W. L. (Lieut. R.A.M.C. Special Reserve)	Edinburgh University	M.B., Ch.B. Univ. Edin.	499

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* These gentlemen, being in possession of certificates obtained in the Officers Training Corps, were awarded service marks under para. 71 of the Regulations for the Officers Training Corps.

† Mr. J. L. Ritchie declined appointment on the present occasion.

NOTES FROM THE CURRAGH CAMP.—Captain Balck forwards a photograph of the winning team, Inter-Regimental Golf Cup, Curragh Camp.

Lieut. F. W. M. Cunningham. Capt. M. C. Wetherell. Lieut. C. Robb.
Capt. H. A. Davidson. Capt. M. W. Falkner.

NOTES FROM DUBLIN.—Captain Boylan Smith writes: "Service in Dublin has two great drawbacks, one is the lack of an officers' mess, the other is like unto it, the want of a recreation ground for the men.

"Suggestions have from time to time been made (by bachelors) to start a mess here, but the authors have either been transferred to other stations, or have got married before they had time to bring their plans to a successful issue. Possibly, when the new hospital is completed we shall be more centralized than at present, and the much desired mess will become a reality. The men also live in hope that a change to new quarters may mean the addition of a cricket and football ground of their own where they can practise with greater regularity than is possible at present.

"In spite of these disadvantages both officers and men find the time pass pleasantly enough as this record of our doings will show. Since the cricket season began we have only had seven matches, of which we won three and lost four. No. 17 Company from the Curragh were our guests on June 10 on the Garrison Ground, Phœnix Park. Both teams lunched together, but in spite of this our guests beat us very easily, Captain Turner playing a very fine innings for them of 119. We hope, if possible, to have a return match at the Curragh before the season closes.

"The Coronation celebrations in London found us represented by officers and men from the Command. How their work was efficiently carried out in their absence is a mystery which they have not yet been able to solve The King's visit to Dublin was the occasion of some extra work and a good deal of extra pleasure, for Dublin was at its best and cheeriest during that too short period.

"To celebrate this visit, on July 10 an excursion to Kingstown was arranged by all the officers for the families of the Warrant Officers, Non-Commissioned Officers, and men to see the Fleet. Two special trams were hired which took the party of 120 odd to Kingstown and back. The day was beautiful and the trip was greatly enjoyed. Each child got a Coronation Medal as well as some fruit and sweets. No casualties were reported owing to the latter gift.

"The officers and their friends took a tram to Kingstown to see the Fleet illuminated on the same evening, but for some undisclosed reason "lights out" was sounded on board all the ships at sundown on that occasion; anyhow there were no illuminations, and as a result some personal, though well meant, criticisms were levelled at the organizer of the trip. The return journey took us through the illuminated streets of Dublin; this sight to some extent mollified the malcontents, so that the organizer of the trip escaped bodily hurt, much to his surprise and delight.

"We have had what we believe was the first golf match between the officers stationed at the Curragh and Dublin. This came off at the Curragh on May 28, between teams of six a side, the play being by 6 singles and 3 foursomes. A win of the match counted 2, while the winner of the bye was credited with ¼. In the foursomes a win counted 2, while the bye counted ½. A most enjoyable day was spent. The Curragh golfers gave us very hard matches on the course, and a very good lunch and supper in their mess. We hope to renew this contest at Dollymount at an early date.

DETAILS OF THE PLAY.

R.A.M.C. Dublin.		R.A.M.C. Curragh.	
Singles.			
Capt. S. Boylan Smith	1	Lieut. F. W. M. Cunningham ..	¼
Capt. C. W. O'Brien	¼	Lieut. C. Robb	1
Lieut. T. H. Dickson..	0	Capt. M. C. Wetherell	1¼
Capt. A. T. Frost	1¼	Capt. H. A. Davidson	0
Lieut.-Col. M. L. Hearn	1¼	Lieut.-Col. G. W. Gubbin	0
Capt. W. D. C Kelly..	¼	Lieut. W. H. S. Burney	1
Foursomes.			
Capt. Smith and Capt. O'Brien ..	0	Lieut. Cunningham and Lieut. Robb	0
Lieut. Dickson and Capt. Frost ..	2	Capt. Wetherell and Capt. Davidson	0
Lieut.-Col. Kearn and Capt. Kelly ..	2	Lieut -Col. Gubbin and Lieut. Burney	2

"In June a handicap match play competition was played on Dollymount amongst Royal Army Medical Corp Members of Royal Dublin Golf Club.

"Lieutenant Colonel Hearn was the popular winner from a handicap of 18, which all his opponents rightly suppose too high for him.

"The Captain's prize at the Royal Dublin Golf Club was won by Captain S. Boylan Smith with a score 87-10-77 from a field of 99 competitors.

"Lawn Tennis seems to be regaining its vogue. Captains Conway, Moss, Tyndale and Dawson are our best players. Captain and Mrs. Moss were very successful at the Carrickmines Tournament, while Captain Conway and Mrs. Dawson figured conspicuously at the Fitzwilliam Tournament.

"The Director-General visited Dublin during the latter part of July while on a tour of inspection through Ireland.

"Opportunity was taken of this by the officers of the Army Medical Service, and Royal Army Medical Corps in Dublin to entertain him to dinner at the Shelborne Hotel, on the evening of July 26. Surgeon-General Bourke, C.B., P.M.O., Irish Command, presided, the Director-General being on his right, while on his left was Surgeon-General Edge, C.B., our other guest who was invited to meet the Director-General. After the usual loyal toast had been honoured, Surgeon-General Bourke proposed the health of Sir Lancelotte Gubbins, to which the latter replied in a speech in which he gave an amusing sketch of his early days at Trinity; in going on to speak of the Service, he reminded us of the necessity of keeping in view the main object of our Corps, namely, the medical service of the Army in war, and proceeded to emphasize the importance of physical fitness as well as professional efficiency as a means towards that end. The speech was received with prolonged applause. The officers present besides our guests were: Surgeon-General G. D. Bourke, C.B., K.H.P., Colonel R. H. S. Sawyer, Lieutenant Colonels C. Birt, M. L. Hearn, M. J. Sexton, O. A. R. Julian, C.M.G., Majors C. Dalton, G. W. Tate, Captains W. M. B. Sparkes, S. B. Smith, W. F. Tyndale, C.M.G., J. H. M Conway, J. H. Douglass, A. T. Frost, E. L. Moss, C. H. Turner, E. B. Booth, G. F. Short, Lieutenants T. H. Dickson, and H. V. Stanley.

"We shall soon be reinforced by some officers who have completed the captain's course at Millbank. We have seen one or two of them *en route* for leave, and judging by their worn and anxious appearance it seems that the mediæval torture known as the Question had much in common with the final examination at the Royal Army Medical College. However, a month's leave should restore them to their normal state.

"We lose about a dozen officers either to Millbank or to Foreign Service from the Dublin district within the next few months; those who remain behind wish them good luck and pleasant stations."

NOTES FROM TIDWORTH.—Lieutenant and Quartermaster C. W. Kinsella, 6th Company, Royal Army Medical Corps, Cosham, writes: "As the Annual Camp of Instruction, Southern Command, has this year been extended to include the training of personnel from the Northern, Western and Scottish Commands, some account of the work carried out may be of interest.

"The camp, delightfully situated, was opened on July 11, when an advance party with the Staff (Major F. W. Begbie, Commandant; Lieutenant C. W. Kinsella, Quartermaster; Serjeant-Major R. Stanley, Quartermaster-Serjeant Horn, and Serjeant Boxshall, Clerk) arrived.

"On July 17, the first party, comprising nine officers (Majors C. B. Martin, W. Marder, and G. T. K. Maurice; Captains Myles, Bowle, Bousfield, and Wilson; Lieutenants McSheehy and Stallybrass) and 182 other ranks arrived and were allotted to Field Ambulance duties.

"The training was carried out as follows, viz.:—

"First day.—Taking over by Section Commanders of the complete ordnance, medical and surgical equipment, and vehicles of their Sections, all articles being vouchered in detail by the Quartermaster. This system has been found to work excellently, bringing home a sense of responsibility to Section Commanders, and familiarizing all ranks with the equipment. This was followed by lectures on guard and picquet duties, camp sanitation, and demonstrations on the working of filter carts and Brownlow filters.

"Second day.—Corps drills and exercises, tent pitching, and lecture by the Commandant on 'Organization of the Army in War.'

"Third day.—Loading and unloading of baggage, and medical store waggons and carts, followed by a lecture on the 'Improvisation of Dressings and Carriage of Wounded, with an outline of the Geneva Convention.'

"Fourth day.—Pitching of dressing stations, removal of wounded by ordinary and improvised methods, bivouacs, &c., followed by lecture on 'The *Rôle* of the Medical Service in the Field.'

"Fifth day.—Drill with all transport, whistle signals being substituted for words of command; laying out Field Ambulance encampment, followed by a lecture and practical demonstration on 'Map Reading.'

"Sixth day.—March out to the digging area at Tidworth Pennings, where field kitchens, latrines, incinerators, &c., were prepared—the men's uncooked rations were taken out and cooked by three methods, viz.: Mess tins, camp kettles on trench kitchen, and in the portable stove, and were eaten on the ground. Dressing-stations, &c., were pitched and wounded collected from the surrounding hills. In the evening a lecture was given by the Quartermaster on a 'Quartermaster's Duties in the Field.'

"Seventh day.—Corps drill and exercises, with lectures on 'The Organization of the Sanitary Service in the Field.'

"Eighth day.—The Field Ambulance marched out as a Unit belonging to an attacking force. Dressing stations were formed, wounded tallied, &c., and all reports and returns rendered.

"Ninth day.—A similar exercise was carried out with a Force holding a defensive position and subsequently retiring. At 9 p.m. the Field Ambulance moved out with an Infantry Brigade for night attack.

"'C' Section Tent Sub-division (Major Maurice), was selected to form a dressing-station near Tidworth Station, the Royal Army Medical Corps Camp representing a clearing hospital, intercommunication being maintained by the 7th Brigade Communication Section with field telegraph.

"The general and special ideas, which culminated in an attack on an entrenched position on Pickpit Hill, were kindly explained by Lieutenant Colonel Boyle, Royal Munster Fusiliers, and perfect march discipline was maintained till the position was stormed at the point of the bayonet. The wounded (tallied) were collected (with lanterns) by the Bearer Sub-divisions, and sent back to the dressing-station.

"At the conclusion of the operations the Brigadier-General and the Administrative Medical Officer Tidworth District (Colonel O'Donnell), were pleased to express their appreciation. Camp was reached about 12.30 a.m.

"Tenth day.—Through the kindness of the Commandant a competition for pitching a dressing-station was entered into by the three sections. Keen rivalry existed, and the judging committee had no mean task in allotting points, the prize being eventually awarded to 'A' Section (Major C. B. Martin).

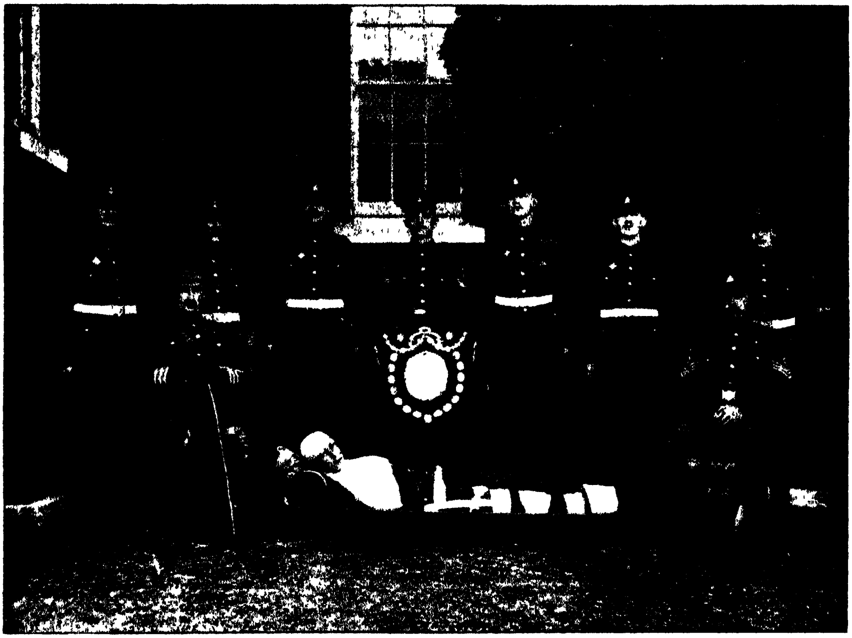
"On July 29, the Section Commanders handed back their equipment to the Quartermaster, prepared Army Forms—I. 1230, &c.—where necessary, and the personnel returned to their various stations looking bronzed and very fit, and immensely benefited by their outing.

"Our visitors have included Lieutenant-Colonel Burtchaell, A.D.G., Lieutenant-Colonel Henderson, Secretary to the Principal Medical Officer, India; Colonel Foster, Canadian Army; and Lieutenant-Colonel James, formerly Officer Commanding Depot, who kindly left us some novel recipes for field rations and improvised methods of removing wounded, on which I hope to report in my next contribution, together with the results of various methods of paper-bag cookery which are undergoing trial—the bags being obtained from the *Daily Express*.

"No fewer than ninety Special Reservists formed part of the first party, and the manner in which all ranks worked together left little or nothing to be desired, while crime and sickness were conspicuous by their absence.

"The second party join on August 2."

NOTES FROM ALDERSHOT.—Serjeant-Major G. H. Roberts forwards a photograph of "B" Company Depot, R.A.M.C., winners of the Challenge Shield for "First Aid Work."



Standing, right to left—Cpl. W. Murray, Pte. C. Goodchild, Pte. F. Aldridge, S.-Sgt. Ryan (coach), Pte. A. Mc. McCombie, Pte. E. Taylor, Pte. G. McLardie. *Sitting*—Major G. G. Delap, D.S.O., Sgt. J. Maxwell.

NOTES FROM MALTA.—Quartermaster-Serjeant Fitch writes under date August 10, 1911: "On Wednesday, July 19, the wedding of Captain R. W. D. Leslie, R.A.M.C., took place at the English Cathedral Church of St. Paul, Valletta. The following account of the ceremony is taken from a local paper:—

"'The English Cathedral Church of St. Paul, Valletta, presented a very animated appearance yesterday afternoon when the sacred edifice was early occupied by a large, fashionable, and generally representative congregation, the occasion being the happy union of Captain Robert Walter Dickson Leslie, Royal Army Medical Corps, with Miss Eleanor Violet Jackson, daughter of Mrs. Field, wife of Captain Frederick L. Field, H.M.S. "Duncan."

"'Colonel R. Porter, M.B., Principal Medical Officer, and Officers and the N.C.O's. and men of the Royal Army Medical Corps were present. Rear-Admiral Thomas H. M. Jerram and several officers H.M.S. "Duncan" were also in attendance.

"'At 2.30 the bride arrived leaning on the arm of her stepfather, and walked up the aisle of the Cathedral which was richly carpeted from the entrance. She looked charming in a costume and train of rich satin, with handsomely embroidered bodice, wearing a beautiful tulle bridal veil surmounted with a wreath of orange blossom, and carrying a large bouquet, the gift of the bridegroom.

" 'Arriving at the altar steps, the ceremony was performed by the Rev. J. Blackbourne, B.A., Senior Chaplain to the Forces, assisted by Rev. Leopold H. Landmann, M.A.. Chaplain H.M.S. "Duncan."

" 'The Service, which was fully choral, comprised Hymns "Lead us, Heavenly Father, lead us" and "O perfect love" which were most effectively rendered to the accompaniment of Professor Hurst, Organist and Choirmaster.

" 'The bride was given away by her stepfather, the office of best man being filled by Captain Hartigan, R.A.M.C.

" 'After the Benediction, the newly-married couple, attended by the Chaplains and party, proceeded to the vestry where the Register was signed; the witnesses being Frederick Lawrence Field, Captain R.N., Annie Norrington Field, Thomas Hewis Martyn Jerram, Rear-Admiral R.N., James Andrew Hartigan, Captain Royal Army Medical Corps.

" 'To the strains of the "Wedding March" the happy couple proceeded down the aisle, which was lined on either side by a detachment of the Royal Army Medical Corps, the officers, ladies and friends generally extending the usual greetings and congratulations at the gate whence the carriage drove off amidst the warmest wishes expressed in "Good luck and prosperity!" graciously acknowledged in the radiant smiles of the pretty young bride and her gallant partner.

" 'Captain and Mrs. Field were "At Home" on board H.M.S. "Duncan" to a large and fashionable assembly, the arrangements for their entertainment being upon a splendid scale, to which the decoration of the ship and the music supplied by the Band, lent additional attraction and enjoyment. Needless to say the health of the newly-married couple was toasted with heartiness at the ceremony of cutting the cake, the entire proceedings being marked by the liveliest enthusiasm.

" 'Captain and Mrs. Leslie left last night by the s.s. "Carola," *en route* for England where the honeymoon will be spent. We join in the congratulations.' "

"The Junior N.C.O.'s, and men of 30 Company, Royal Army Medical Corps, held a garden party in the hospital grounds at Cottonera, on Thursday, July 20, when they were 'at home' to about five hundred friends, &c. The weather was all that could be desired, a merciful breeze counteracting Old Sol's unmerciful rays. The visitors began to arrive about 3 p.m. What the worthy Master of Ceremonies and Secretary with their auxiliaries did not provide in the way of games and amusements would hardly be worth mentioning. The juniors, with their usual hospitality, provided an excellent tea. At this point an excellent group photograph was taken of nearly the whole of the hosts and visitors. This was followed by a private tombola. The evening entertainment consisted of a concert with dancing between the various items. The grounds looked a veritable picture with hundreds of fairy illuminations. The tennis court was used for dancing, while a temporary stage was erected on one side of it. We were favoured by the presence of the officers of the Royal Army Medical Corps and their ladies, and the Matron and members of Q.A.I.M.N.S. Our thanks are due to the artists who contributed various items, to Mr. Sceberras and his most efficient orchestra, and to Bandsmen Davies, of the Gloucestershire Regiment, who presided at the piano. But the greatest praise is due to the Honorary Secretary, Master of Ceremonies and committee, since the success of the whole proceedings was due to their combined efforts.

"On Wednesday evening, August 1, at the Serjeant's Mess, Valletta, the W.O.'s and N.C.O.'s, of the Company bade farewell to Serjeant-Major H. J. Dudman, R.A.M.C., who took his discharge locally on August 4, after a period of twenty-six years in the Corps, eighteen of which he has served in Malta.

"Serjeant-Major Collard being on the sick list, the presentation (a handsome dinner service) was made on behalf of the W.O.'s, and N.C.O.'s, by Serjeant-Major Huntingford, R.A.M.C., who, in wishing him success, particularly referred to the great loss S. M. Dudman would be to the cricket team, with which he has been closely associated for so many years.

"S. M. Dudman expressed his thanks for the presentation in a few suitable remarks, and his regret at leaving so many worthy comrades."

NOTES FROM BLOEMFONTEIN.—Major H. B. Fawcus writes: "An excellent concert was given on Thursday, July 13, by No 24 Company, Royal Army Medical Corps, assisted by Lieutenant-Colonel and Mrs. Hanley, Lieutenant A. M. Pollard, and Staff-Nurse McCreery. A stage was erected in the concert room, and the footlights of electric lamps, and the scenery, which was painted by Private Gregory, R.A.M.C., gave great effect to the evening's enjoyment.

"There were 150 people present, and the concert, which lasted two and a half hours, was thoroughly appreciated by patients and visitors.

"There is some excellent talent amongst the men of the Company, and it is hoped that in a short time a permanent concert room may be obtained to enable the variety troupe to give frequent concerts to relieve the monotony of our part of Tempe.

PROGRAMME.

Part I.

1.	*Pianoforte Selection*	'Maritana'	Staff-Sjt. GRANGER
2.	*Song*	'The Deathless Army'	Pte. HAWKES
3.	*Song (comic)*	'I began to run'	Pte. BARKER
4.	*Song*	'Eileen Alanah'	Staff Nurse MCCREERY
5.	*Song (comic)*	'As a Friend'	Pte. PALMER
6.	*Song (duet)*	'Larboard Watch'	St.-Sjt. GRANGER and Pte. HAWKES
7.	*Song*	'The Dear Old Shore'	Pte. GARDNER
8.	*Song (descriptive)*	'Dreams'	Pte. WRIGHT
9.	*Song*	'Three Jolly Boys'	Lieut. POLLARD
10.	*Song (comic)*	'Captain Ginger'	Pte. WILLIAMSON
11.	*Song*	'Yip i addy i ay'	Mrs. HANLEY

12. THE R.A.M.C. COMEDY FOUR,
in a short Farcical Comedy, entitled
'The Biter Bit.'

Scene—Exterior of the Red Lion Inn.

Joe Days, the Innkeeper	Pte. WRIGHT
Ada Bryant, a Waitress	Pte. E B. KING
Algy Jones, a Gentleman Pugilist	Pte. GARDNER
Puncher Bill, the Village Bully	Pte. BARKER

Part II.

13.	*Song (comic)*	'I said Yes'	Pte. BARKER
14.	*Song*	'The Last Watch'	Pte. HAWKES
15.	*Song (comic)*	'John Willie, Come on'	Pte. PALMER
16.	*Song*	'The Ballyhooley Horse'	Lieut.-Col. HANLEY
17.	*Song*	'Red Wing'	Staff-Nurse MCCREERY
18.	*Song*	'Yeoman of England'	Lieut. POLLARD
19.	*Song*	'When the Lights are Low'	Pte. WRIGHT
20.	*Song and Patter*	'The Brothers McGee'	Pte. WILLIAMSON and Pte. KILBY
21.	*Song*	'I alus wears an Orchid next my heart'	Pte. GARDNER

'GOD SAVE THE KING.'

"ROYAL ARMY MEDICAL CORPS RIFLE CLUB.

"The monthly shoot for the July spoon took place on Thursday, July 20, at 600 yds. range. There was a heavy wind blowing, which resulted in some bad shooting. The spoon was won by Private Duncombe, a new member, who started plus 8."

NOTES FROM PIETERMARITZBURG.—Serjeant-Major W. Wilson writes under date July 10: "The detachment Royal Army Medical Corps with their comrades of the Army Service Corps, celebrated the occasion of the Coronation of H. M. King George by giving a soirée in the Camp Theatre, Maritzburg, on Coronation day.

"The affair, which was largely attended by our military and civilian friends, was a huge success.

"Songs were rendered by the Misses Pless, Q.M.S. Hasler, Privates Fraser and Waters, R.A.M.C., Private Johnson, A.S.C., Corporal Boniface, A.V.C., and a Dutch Dance by Captain and Mrs. Leslie, R.A.M.C., was certainly the turn of the evening; all were heartily encored in spite of the attraction of the dancing. A farcical sketch entitled 'The New Clerk,' in which the leading parts were taken by Private Palmer, R.A.M.C., and Private Roderick, A.O.C., caused roars of laughter.

"Dancing was carried on until the small hours of the morning. Major, Mrs. and Miss Smithson, Captain and Mrs. Leslie, R.A.M.C., and Lieutenant Gaskell, A.S.C., spent the greater part of the evening with us, and Sister Johnson and Staff-Nurse Gardner attended the concert.

"Refreshments, liberal and excellent, were dispensed in a manner seldom seen in Maritzburg.

"The party broke up after singing the National Anthem with all the fervour the occasion called for.

"Great credit is due to Serjeant Day, R.A.M.C., and his committee for the amount of hard work they put in to make things a success, and they richly deserved the expressions of approval which were heard on all sides.

"Ladies of the Q.A.I.M.N.S. have again been sent here for duty, Sister M. C. Johnston, and Staff-Nurse Miss J. S. G. Gardner arriving on June, 1911.

"Corporal Higgins and Private Baxter have gone to Pretoria for Part 'B' dispensers' examination.

"The football season is in full swing, but although we try very hard we are unable to gain a very prominent position in the District League."

NOTES FROM SIMLA.—Major H. G. F. Stallard, R.A.M.C., Officiating Secretary to the Principal Medical Officer, His Majesty's Forces in India, writes as follows. Dated July 27, 1911:

"*Leave.*—The undermentioned officers have been granted extensions of leave on the recommendation of medical boards: Captains T. W. Browne, R.A.M.C., from July 5, 1911, to November 4, 1911; C. Kelly, R.A.M.C. from July 5, 1911, to January, 1912 The grant of general leave to the undermentioned officers has been concurred in. Major C. W. Mainprise, R.A.M.C., for three months from August 9, 1911; Captain G. Petit, R.A.M.C, for three months from August 1, 1911; Major T. H. J. C. Goodwin, R.A.M.C., for three months from August 8, 1911.

PROMOTIONS.

The following promotions, to complete Establishment, will take effect from the dates specified:—

To be Serjeant-Majors.

No.	Rank and Name		Date	Section	Remarks
9651	Qmr.-Serjt.	Birch, E ..	2.5.11	..	*Vice* J M. Rapson, to pension.
9801	,, ,,	Duff, H. ..	5.5.11	..	,, W. E. Hill, to pension.
10566	,, ,,	Dring, B. C. ..	8.5.11	..	,, H. J. Ford, to pension.
9876	,, ,,	Powell, A. G. ..	12.5.11	..	,, A R. Rees, to pension.
10993	,, ,,	Reynolds, R.S.A.	13.6.11	..	,, F W. Nelson, to pension.
10295	,, ,,	Strong, C. H. ..	19.7.11	..	,, C. H. Cooper, promoted H.M.C.

To be Quartermaster-Serjeants.

11039	S.-Serjt. ..	Richardson, F.	8.4.11	..	*Vice* J Carter, to pension.
11533	,, ,,	Starkie, J. T. ..	5.5 11	..	,, H. Duff, promoted.
11714	,, ,,	Kerstein, E. ..	8.5.11	..	,, B. C. Dring, promoted.
12202	,, ,,	Connolly, T. ..	12.5.11	..	,, A. G. Powell, promoted.
10188	,, ,,	Manwaring, R.E.	13.5.11	..	,, R.S A. Reynolds, promoted

To be Staff-Serjeants.

10005	Serjeant ..	Hughes, W. T.	8.4.11	..	*Vice* F. Richardson, promoted.
15619	,, ..	Preston, E. ..	8.4.11	..	,, W. T. Hughes, Supernumerary with Territorial Forces.
12495	,, ..	Brewer, T. H...	3.5.11	..	,, J. W. Elliott, to pension.
17273	,, ..	Jones, W. H. ..	5.5.11	..	,, J. T. Starkie, promoted.

To be Staff-Serjeants.—continued.

No.	Rank and Name		Date	Section	Remarks
14705	Serjeant ..	Muirhead, W. A.	8.5.11	..	*Vice* E. Kerstein promoted.
8763	,, ..	Yeoman, H. ..	10.5.11	..	Under para. 351, King's Regulations. Supernumerary with Territorial Forces.
10736	,, ..	Gray, G. E. ..	12.5.11	..	*Vice* T. Connolly, promoted.
12365	,, ..	Brodie, W. L...	15.5.11	..	,, W. H. Mellon, to pension.
10762	,, ..	Edwards, C. H.	17.5.11	..	,, J. Dunn, to territorial Forces.
9457	,, ..	Griffiths, W. ..	31.5.11	..	,, R. Pinder, to pension.
13317	,, ..	Wheeler, C. F.	3.6.11	..	,, J. E. Landon, to pension.
12410	,, ..	Coombs, R. B.	13.6.11	..	,, R. E. Manwaring, promoted.
15634	,, ..	Drummond, W. R. E.	27.6.11	..	,, C. Davies, to pension.
			To be Serjeants.		
9454	Lce.-Serjt.	Girling, A. N ..	8.4.11	Cooking ..	Special as Superintending Cook, *vice* E. Preston, promoted.
12322	Serjt. ..	Webster, W. ..	21.4.11	Nursing ..	From Colonial Government, *vice* E. Stokes, deceased.
14072	Lce.-Serjt.	Benham, R. R.	21.4.11	,, ..	*Vice* F. Knott, to Colonial Government.
18213	,, ..	Pacey, W. C. ..	23.4.11	,, ..	,, T. H. Griggs, discharged.
12768	,, ..	Kent, T. R. ..	3.5.11	,, ..	,, H. T. Brewer, promoted.
12187	,, ..	Brookes, J. A. ..	5.5.11	,, ..	,, W. H. Jones, promoted.
14686	,, ..	Wilson, W. A...	8.5.11	General Duty	,, W. A. Muirhead, promoted.
14761	,, ..	Robertson, W...	12.5.11	Cooking ..	,, G. E. Gray, promoted.
11583	Serjt. ..	McCarthy, W...	15.5.11	Nursing ..	From Territorial Forces, *vice* W. L. Brodie, promoted.
18122	Lce.-Serjt.	Kirby, J. A. ..	17.5.11	General Duty	*Vice* C. H. Edwards, promoted.
12819	,, ..	Riches, W. H...	23.5.11	,, ,,	,, R. Wilson, to pension.
14924	Corporal ..	Forbes, J. G. A.	31.5.11	Nursing ..	,, W. Griffiths, promoted.
12038	Lce.-Serjt.	Garlick, I. H. ..	3.6.11	Clerical ..	,, C. F. Wheeler, promoted.
11929	Corporal ..	Cooper, W. J. ..	13.6.11	General Duty	,, R. B. Coombs, promoted.
12712	,, ..	Hutchinson, W.	17.6.11	Nursing ..	,, O. White, to Army Reserve.
10830	Serjt. ..	Davidson, A. ..	27.6.11	,, ..	From Colonial Government, *vice* W. H. E. Drummond, promoted.
11024	Lce.-Serjt.	Catherall, W...	1.7.11	,, ..	*Vice* C. Wilson, to Territorial Forces.

To be Corporals.

No.	Rank and Name		Date	Section	Remarks
17742	Lce.-Corpl.	Platt, A. T. ..	1.7.11	General Duty	To complete Establishment.
18229	,, ..	Turbyne, J. ..		,, ,,	
18318	,, ..	Thomas, E. G.		Clerical ..	
18301	,, ..	Molden, C. J. ..		,, ..	
18335	,, ..	Woolway, W. J.		Q.A.I.M.N.S.	
18330	,, ..	Mercer, J. N. ..		Clerical ..	
18340	,, ..	Rouse, J. ..		Nursing ..	
18383	,, ..	Hutchings, W.		Clerical ..	
18411	,, ..	Richards, G. H.		Nursing ..	
18418	,, ..	Smith, G. ..		,, ..	
18443	,, ..	Harris, G. ..		Q.A.I.M.N.S.	
18447	,, ..	Fakes, J. E. ..		Clerical ..	
18468	,, ..	Buchanan, W.H.		,, ..	
18490	,, ..	Cooper, H. ..		,, ..	
19256	,, ..	King, W. ..		Nursing ..	
19652	,, ..	Jefford, C. V. ..		,, ..	
764	,, ..	Boddy, R. ..		,, ..	
391	,, ..	Scorey, W. J ..		General Duty	
2046	,, ..	Hammond, F. J.		Clerical ..	
11951	,, ..	Hoodless, T. J.		Nursing ..	
1847	,, ..	Ogg, R. W. ..		,, ,,	
13036	,, ..	Flood, S. ..		,, ,,	
14956	,, ..	Stangroom, E. J.		,, ,,	
16299	,, ..	Plunkett, E. P.		Clerical ..	

APPOINTMENTS.

The following appointments, to complete Establishment, will take effect from the dates specified. –

To be Lance-Serjeants.

11033	Corporal ..	Chrisp, A. ..	1.7.11	Cooking ..	Special as Superintending Cook.	**To complete Establishment.**
16304	,, ..	Langley, A. ..		Nursing ..		
12242	,, ..	Luxton, A J. ..		,, ..	As Dispensers.	
12661	,, ..	Grinham, C. W.		Cooking ..		
11440	,, ..	Farmer, A. ..		General Duty		
13921	,, ..	Cooper, J W. ..		,, ,,		
15783	,, ..	Lloyd, E. F. H.		,, ,,		
15848	,, .	Garbett-Burbridge, A. E.		Nursing ..		
12302	. .	Whyte, W. ..		,, ..		
12411	,, ..	Sims, A. A. ..		Q.A.I.M.N.S.		
12547	,, ..	Triggs, A. ..		Nursing ..		
12651	,, ..	Bennett, R. H.		,, ..		

To be Lance-Corporals.

No.	Rank and Name		Date	Section	Remarks
19282*	Private ..	Golden, H. ..	9.6.11	1st Class Clerk	To complete Establishment
19805*	,, ..	Hanrahan, J...		Nursing ..	
1843*	,, ..	Mack, C. A. ..		Clerical ..	
1905*	,, ..	Eves, J. G. ..		1st Class Clerk	
1305*	,, ..	Prince, H. M...	19.6.11	Clerical ..	
19747*	,, ..	Hyde, C. H. ..	21.6.11	Nursing ..	
2113*	,, ..	Bickers, H. ..		Clerical ..	
1620*	,, ..	Pegg, A. E. ..		General Duty	
19641*	,, ..	Hardic. W. M...	26.6.11	Clerical ..	
9231	,, ..	Thompson, W.E.	1.7.11	Superintending Cook	
12272	,, ..	King, F. ..		Superintending Cook	
15549	,, ..	Ennis, H. .		General Duty	
16303	,, ..	Cunningham, H.		1st Class Clerk	
16462	,, ..	Pashman, A. A.		Nursing ..	
16913	,, ..	Darby, J. ..		Superintending Cook	
18992	,, ..	Brennan, R J.		General Duty	
19001	,, ..	Barritt, J. ..		Q.A I.M.N.S.	
19048	, ..	Black, J. ..		Nursing ..	
19464	,, ..	Chamberlain, C.		,, ,,	
19080	,, ..	Cove, J. S. ..		General Duty	
19079	,, ..	Stoneham, E. G.		Nursing ..	
19085	,, ..	Vinton, C. J. ..		,, ..	
19086	,, ..	Wain, A. ..		,, ..	
19097	,, ..	Koftoff, A. ..		,, ..	
19110	,, ..	Smith, C. H. ..		,, ..	
19118	.. ..	Moore, J. ..		General Duty	
19126	,, ..	Perkins, F. H.		1st Class Clerk	
19135	,, ..	Quelch, W. H.		Nursing ..	
19161	,, ..	Parkinson, G...		,, ..	
19160	,, ..	Preston, C. J...		,, ..	
19170	,, ..	Jessop, A. G. ..		,, ..	
19193	,, ..	Stebbings, W. M.		General Duty	
19200	, ..	Ballantine, J...		Nursing ..	
19198	,, ..	Harper, F. T. ..		,, ..	
19202	,, ..	Baiden, F. J. R.		,, ..	
19236	,, ..	Pettit, E. F. ..		,, ..	
19240	,, ..	Scasbrook, T.C.S.		1st Class Clerk	
19247	,, ..	Mason, T. H. ..		General Duty	

Special under para. 281, Standing Orders, R.A.M.C.

AWARD OF ARMY FORM C. 344

The undermentioned have been awarded A.F. C 344, on completion of three years training, on the dates specified :—

No	Rank and Name		Date	No.	*Rank and Name		Date
19864	Private..	Pitt, T. R. ..	5.9.10	19821	Private..	Young, B. L.	31.3.11
19023	Lce.-Cpl.	Tarbett, A. ..	6.9.10	18518	Lce.-Cpl.	Darlington, J. W	8.6.11
1098	Private..	Wright, G. M.	6.9.10	19259	Private..	Burrows, A.W.	21.6.11
18337	Serjt. ..	Leaker, C. ..	30.9.10	19429	,, ..	Orton, R.	21.6.11
19320	Corpl. ..	Ritchie, H. A.	30.9.10				

NURSING SECTION.

The following appointments to the Nursing Section of the Corps will take effect from the dates specified:—

No.	Rank and Name		Date	No	Rank and Name		Date
17102	Srjt. ..	Harvey, D. ..	20.3 11	5083	Pte. ..	Salway, T. ..	6.5.11
4520	Pte. ..	Carter, J. ..	3.4.11	4826	,, ..	Wheeler, W. H.	9.5.11
5057	,, ..	Carter, T. D. ..	3.4.11	5110	,, ..	Samme, J. E...	9.5.11
1424	,, ..	Ryan, J. ..	6.4.11	5151	,, ..	Francis, G. E.	9·5·11
4903	,, ..	Hooper, W. ..	6.4.11	5097	,, ..	Woodfield, J. H.	15.5.11
5045	,, ..	Golding, W. C.	6.4.11	13032	Serjt. ..	Kerr, T. ..	19.5.11
5066	,, ..	Brown, T. ..	6.4.11	2232	Pte. ..	Cooke, W. S. A.	21.5.11
5106	,, ..	Clarke, A. E. ..	6.4.11	4803	,, ..	Foggin, W. ..	24.5.11
5118	,, ..	O'Donohoe, W.C.	6.4.11	5107	,, ..	Traves, A. E. ..	24.5.11
4872	,, ..	Jackson, A. E.	8.4.11	5108	,, ..	Westwood, C. ..	24.5.11
5048	,, ..	Suter, J. W. P.	8.4.11	4935	,, ..	Andrews, W. ..	26.5.11
5082	,, ..	Kelly, J. ..	8.4.11	5021	,, ..	Johns, A. F. ..	26.5.11
5072	,, ..	Parsons, S. T.	13.4.11	5138	,, ..	Ransome, D. ..	26.5.11
19618*	Crpl. ..	Bettison, P. ..	13.4.11	4747	,, ..	Booth, W. ..	30.5.11
763†	Pte. ..	Desmond, T. ..	19.4.11	4904	,, ..	Lawson. J. ..	30.5.11
4963	,, ..	Darlington, O.	19.4.11	5014	,, ..	Bitten, G. J. ..	30.5.11
19815	,, ..	Smith, A. ..	24.4 11	5020	,, ..	Randall, F. ..	30.5.11
4428	,, ..	Barker, K. ..	24.4.11	5025	,, ..	Parsons, E. ..	30.5.11
2235	L.-Crpl.	Walkley, T. ..	1.5 11	5239	,, .	Stow, S. R. ..	30.5.11
4737	Pte. ..	Haylos, H. D...	2.5.11	5452	,, ..	Griffiths, H. ..	30.5.11
5095	,, ..	Peyton, T. ..	2.5.11	4911	,, ..	Washbrook H	9.6.11

Supernumerary. † Reappointed.

ADVANCEMENT OF PRIVATES (CORPS PAY).

The following advancements in rate of Corps Pay will take effect from July 1, 1911:—

To be Advanced to the Third Rate (at 8d.).

As Orderlies.

No.	Name	No.	Name	No.	Name
11959	Jones, A. E.	809	Rowland, T.	1946	Jane, E.
17123	Sawyer, W. H.	963	White, J.	1953	Marchants, H.
17363	Bradshaw, J.	1071	Stocker, J. N.	1981	Pavier, G.
17761	Dunkley, W. A.	1368	Bunker, A.	1993	Passingham, E. G.
19461	Purnell, H. D.	1383	Rouse, J.	2002	Cradduck, G.
19506	Thorne, C. L.	1491	Harding, G.	2027	Coney, E. H.
19607	Pottow, R. C.	1505	Callis, F. G.	2071	Coote, R. H.
19745	Young, H. S.	1519	Price, W. J.	2083	Pearce, W. G.
19776	Swan, G.	1531	Kilby, F. J.	2126	Hardy, R. H.
19777	Harland, F.	1556	Calvert, N. B.	2135	Kellow, W.
19823	Kilyon, T. J.	1688	Drew, G. H. F.	2167	Stirk, A. J.
19835	Sandys, A. E.	1700	Waterfield, E.	2170	Tromans, W. B.
84	Richardson, J.	1713	McCarthy, F. B.	2191	Hayes, J. W.
226	Wilks, A. H.	1716	Duncombe, F.G.H.	2258	Edmonds, W.
228	Sheehan, J D.	1894	Benjafield, H. J.	2264	Blake, W. T. H.
418	Horsfall, B.	1932	Neville, W. E.		
728	Brooks, A. T.	1945	Chapman, A.		

As Clerks.

No	Name	No.	Name	No.	Name
411 1868	Bowden, C. G. Browne, E. B.	2221	Coleman, G.	4653	Bartlett. C. J.

To be Advanced to the Fourth Rate (at 6d.).

As Orderlies.

16455	Babb, C A	2182	McDonnell, J.	4794	Pither, A. G
18887	Bell, W. R.	2193	Williams, J	4798	Connor, P.
19167	Stokes, H E	2206	Ede, L, C.	4800	Washbourne, A. F
19358	Calvert, F	2300	Barker, A. C.	4801	Jackson, H.
19536	Reece, E.	4301	Locke, C. R.	4807	French, C. E. R.
19592	Ranger, H P.	4329	Wilkin, R. S.	4809	Maplesden, R. B.
10	Cushing, G F.	4338	Kemp, A.	4824	Burnell, W. D.
119	Murray, J. M.	4343	Parr, W. S.	4826	Wheeler, W. H.
221	Long, G. J.	4377	Lovegrove, S. J	4827	Hinton, H.
942	Crozier, W. E. A.	4391	Smith, G.	4835	Johnstone, D.
943	Ball, A H.	4459	Gilley, F. A.	4853	Edwards, C J.
1302	Jack, J	4470	King, A.	4857	Hall, T. G.
1342	Davis, H	4593	Martin, P. G.	4872	Jackson, A. E.
1456	Hird, F. F.	4596	Richards, G. R.	4885	Russell, P. F.
1569	Farmer, G. L	4601	Ginman, L. H.	4894	Crossman, W. G
1578	Savage E.	4624	Wharram, L. S. S.	4936	Strange, H. E.
1764	Selden, H. W	4636	Bird, R. C.	4940	Holway, A. L.
1865	Johnstone, R.	4643	Lillywhite, P.	4941	Pierce, W.
1912	Higginson, W.	4666	Pearce, D.	4957	Grant, F. J. L.
1951	Money, F. J. R.	4697	Tucker, J. H.	4960	Price, W. A.
1972	Davidson, B.	4709	Crossland, R. J. E.	4974	Frost, R. F. M.
1974	Ferguson, C. D.	4728	James, A.	4976	Hall, W. W. C.
2054	Berry, G. H.	4730	Freeman, J.	5037	Sykes, W. J.
2074	Bowen, C.	4754	Sanders, H.	5091	Godfrey, J.
2086	Grimes, H	4777	Ball, F,	5093	Stallwood, F. E.
2137	Crack, F.	4782	Meller, H. T.	5179	Clark, T.
2141	Gray, C.	4787	Audus, H. A. L.	5239	Stow, S. R

As Clerks.

19039	Emerson, J. T.	4357	Harding, T. H.	4922	Elliott, E. F.
2225	Paterson, M	4534	Warnes, H. J.	4961	Day, A.
4307	Hayes, H	4569	Richardson, L.		

As Cooks.

19581	Cannon, H. J.	1493	Parsons, W. J.	4802	Craig, R. H.
19608	McPhail, C. W.	4427	Richards, A. H.	4914	Simpson, J. W.
167	Hutchison, A. J.	4572	Dixon, F.	4937	Dunkley, H.
796	Tingley, A.	4715	Batchelor, J. H.	4965	Thompson, W.

SANITARY ORDERLIES (CORPS PAY).

The following Privates are advanced to the Fourth Rate of Corps Pay at 6d., as Sanitary Orderlies, from the dates specified :—

No.	Name	Date	No.	Name	Date
2297	Lawson, S.	1.3.11	4704	Cowley, F.	1.5.11
4409	Chambers, S.	25.3.11	2194	Downs, J. W.	4.5.11
18628	Pemberton, G.	1.4.11	1935	Harple, F.	4.5.11
2150	Fraser, E. G.	6.4.11	19623	Stabler, J.	6.5.11
660	Dotterill, H. C.	6.4.11	4568	Wilson, J. K.	15.5.11
19280	Clarke, E.	20.4.11	2140	Armstrong, J	16.5.11
19880	Parkings, A. L.	22.4.11	990	Tasker, S. E.	18.5.11
1447	Conway, P.	26.4.11	827	Stammers, A.	1.6.11
957	Hunt, H. A.	27.4.11	2063	Crofts, C.	27.6.11
4913	Nordstrom, R. J.	28.4.11			

BUGLERS.

The following are appointed Buglers from the dates specified .—

No.	Rank and Name		Date	No.	Rank and Name		Date
1833	Pte.	Taylor, J C. T.	6.4.11	5024	Boy	Ballan, D. J,	9.5.11
4727	Boy	Conway, J. T.	9.5.11	5234	,,	Mills, H. St. J.	9.6.11

DISCHARGES.

7680	Serj.-Major	Carey, W.	28.7 11	Medically unfit.
6343	,,	Dudman, H. J.	4.8.11	To pension.
8842	Qmr.-Serj.	Akehurst, W. H.	25.7.11	Termination of second period.
8839	S.-Serj.	Harris, E. J.	27.7.11	,, ,, ,,
6340	,,	Mister, A. E. W.	9.8.11	After 3 months' notice.
12395	Serjeant	Gibson, E. J.	31.7.11	Free after 12 years (Art. 1058) (2) R.W.
4734	Private	Burgess, H.	17.7.11	After 3 months' notice.
9921	,,	Bond, J. J.	5.8.11	At his own request after 18 years.
5322	,,	Shergold, B. S.	5.8.11	Medically unfit.
5337	Boy	Green, A. G.	5.8.11	,, ,,
1189	Private	Ivors, P.	3.7.11	Payment of £18.
1835	,,	McDowell, A.	3.7.11	,, ,,
211	,,	Goulding, G. F.	8.7.11	,, ,,

TRANSFERS TO ARMY RESERVE.

18920	Pte.	Jones, E. H.	13.7.11	1864	Pte.	Lowe, F.	4.8.11
1853	,,	Trower, H. J.	17.7.11	19043	,,	Speers, W.	3.8.11
18922	,,	Cussell, G.	15.7.11	1863	,,	Cowper, W. M.	3.8.11
19127	,,	Ayling, D. J.	14.7.11	1857	,,	Edgar, L. W.	31.7.11
1854	,,	Dawson, J.	20.7.11	19164	,,	Cole, T. G.	3.8.11
1937	,,	Cain, A.	21.7.11	1874	,,	Ferdinando, T.	13.8.11
19508	,,	Fenton, E.	22.7.11	19170	L.-Cpl.	Jessop, A. G.	9.8.11
19149	,,	Whitbread, A. C.	1.8.11	1871	Pte.	Hart, J.	9.8.11
1862	,,	Doyle, G. A.	2.8.11	1872	,,	Glancy, J.	10.8.11
19159	,,	Randle, W. H.	3.8.11				

TRANSFERS TO OTHER CORPS.

16097	Serjeant ..	Bowen, E.	28.7.11	To R.A.M.C. Terr. School of Instruction, H. Div. Maidstone.
5526	Private ..	Brodie, R.	14.7.11	To 2nd Batt. Scottish Rifles.
5510	,, ..	White, E.	19.7.11	,, 1st Batt. King's Royal Rifles.
4792	,, ..	Dyson, W.	17.7.11	,, 2nd West Riding Regt.
5534	,, ..	Glanville, J. C. ..	24.7.11	,, 1st Batt. King's Royal Rifles

TRANSFERS FROM OTHER CORPS.

5581	Private ..	Malyon, P.	14.7.11	From 2nd Dragoon Guards.
5582	,, ..	Fielder, A. G. ..	14.7.11	,, East Surrey Regiment.
5615	,, ..	Cook, A. G... ..	13.6.11	,, 3rd Batt. Royal Fusiliers.
5632	,, ..	Barsley, W. P. ..	1.7.11	,, 1st Cameronians.
5628	,, ..	Garwood, A. ..	17.7.11	,, 1st Batt. Suffolk Regt.

APPOINTMENTS.

BUGLERS.

5011	Boy ..	Marsh, C. W. ..	15.7.11	
5334	,, ..	Halliday, W. ..	15.7.11	
5335	,, ..	Osborne, F. R. ..	15.7.11	
5341	,, ..	Conway, W. E. ..	15.7.11	

BUGLER TO THE RANKS.

2189	Bugler ..	Munden, W. J. ..	7.7.11	

EMBARKATIONS FOR ABROAD.

TO SIERRA LEONE, PER S.S. "BATHURST," JUNE 29, 1911.

12138	S. Serjt. ..	Steele, H.	18656	Lce.-Corpl.	Maywood, H. G.
15648	Serjeant ..	Hill, F. J.	19198	Private ..	Harper, F. T.
751	Corporal ..	Milne, A. J.			

DISEMBARKATIONS FROM ABROAD.

FROM SIERRA LEONE, PER S.S. "FANTEE," AUGUST 1, 1911.

10892	S.-Serjt. ..	Reeve, H. J.	17513	Corporal ..	Gallivan, J.
16205	Serjeant ..	Gregson, T.	19029	,, ..	Harvey, R. E.

THE FOLLOWING N.C.O.'s AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

FOR QUARTERMASTER-SERJEANT.

10822	S.-Serjt. ..	Reeve, H. J.			

FOR STAFF-SERJEANT.

16205	Serjeant ..	Gregson, T.	11327	Serjeant ..	Quinlan, M. K.

For Serjeant.

12242	Lce.-Serj.	Luxton, A. J.	15967	Corporal ..	Tringham, W. T.

For Corporal.

18727	Private ..	Lewis, T. M.	19119	Private ..	Bennett, W. E,
5166	,, ..	Blair, J.	918	,, ..	Nelson, W.
5171	,, ..	Eason, W. E. L.	2002	,, ..	Cradduck, G.
1970	,, ..	Brunt, W. J. G.			

Serjeant R. J. McKay re-embarked for Northern Nigeria on July 26, 1911.

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

To be Lieutenants (on probation): Cadet Private Vivian Ramsay Smith from the Edinburgh University Contingent, Officers' Training Corps, dated July 23, 1911; Cadet Corporal Charles Crawford Jones, M.B., from the University of Birmingham Contingent, Officers' Training Corps, dated July 22, 1911.

TERRITORIAL FORCE.

Royal Garrison Artillery.

Cornwall (Duke of Cornwall's) Royal Garrison Artillery.—Surgeon-Major Robert G. Nesbitt resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated July 22, 1911.

Infantry.

3rd Battalion, The Monmouthshire Regiment.—Surgeon-Lieutenant-Colonel and Honorary Surgeon-Colonel Samuel B. Mason resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated July 29, 1911.

4th Battalion, The Loyal North Lancashire Regiment.—Surgeon-Captain John W. Rigby resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated August 12, 1911.

Royal Army Medical Corps.

Yorkshire Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Thomas Edmund Lister, M.B., to be Lieutenant, dated June 1, 1911.

1st Home Counties Field Ambulance, Royal Army Medical Corps.—Lieutenant Arthur T. Falwasser, to be Captain, dated June 12, 1911.

1st Lowland Field Ambulance, Royal Army Medical Corps.—Neil MacInnes, M.B. to be Lieutenant, dated June 19, 1911.

3rd North Midland Field Ambulance, Royal Army Medical Corps.—Lieutenant Philip W. Turnor resigns his commission, dated July 22, 1911.

3rd South Midland Field Ambulance, Royal Army Medical Corps.—Charles Edward Kynaston Herapath, M.B., to be Lieutenant, dated April 1, 1911.

1st Northumbrian Field Ambulance, Royal Army Medical Corps.—John Hare, M.B. (late Cadet Lance-Corporal, Durham University Contingent, Senior Division, Officers' Training Corps) to be Lieutenant. (To be supernumerary). Dated May 27, 1911.

Yorkshire Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Major William K. Clayton to be Lieutenant-Colonel, dated January 1, 1911.

2nd West Riding Field Ambulance, Royal Army Medical Corps.—Major William McG. Young, M.D., to be Lieutenant-Colonel, dated April 1, 1911.

2nd Home Counties Field Ambulance, Royal Army Medical Corps.—Major David L. Hamilton, F.R.C.S. (Edin.), to be Lieutenant-Colonel, dated June 17, 1911.

2nd London (City of London) Field Ambulance, Royal Army Medical Corps.—Major William Salisbury Sharpe, M.D., from the 3rd London (City of London) Field Ambulance, Royal Army Medical Corps, to be Major, dated July 1, 1911.

2nd North Midland Field Ambulance, Royal Army Medical Corps.—Lieutenant Evan L. Jenkins resigns his commission, dated July 29, 1911.

5th London Field Ambulance, Royal Army Medical Corps.—Lieutenant William C. Macaulay, M.B., to be Captain, dated June 13, 1911.

1st South Western Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Major George R. Swinhoe, whose resignation was announced in the *London Gazette* of August 10, 1909, is granted permission to retain his rank and to wear the prescribed uniform.

Officers Attached to other Units.

William Howard Edwin Stewart to be Lieutenant, dated April 14, 1911.
Lieutenant Frederick J. Green, M.D., to be Captain, dated April 11, 1911.
Captain Edmund E. Dyer, M.B., to be Major, dated July 5, 1911.
Arthur Edward Gladstone to be Lieutenant, dated May 16, 1911.
John Brabent Bate, M.D., to be Lieutenant, dated June 17, 1911.

ARMY MEDICAL RESERVE.

Lieutenant Walter G. H. Cable to be Captain, dated July 1, 1911; Lieutenant Cecil Ewing resigns his commission, dated August 2, 1911.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Sisters: Miss C. G. Lees, to Chatham, from Egypt; Miss M. Barton, Aldershot, from Egypt, Miss A. M. MacCormac, to London, from Aldershot; Miss L. M. Moore, to Pretoria, S.A., from Wynberg.

Appointments Confirmed.—Staff Nurses: Miss E. M. Moore.

Arrivals.—Miss C. G. Lees, Sister, from Egypt; Miss M. Barton, Sister, from Egypt.

ROYAL ARMY MEDICAL COLLEGE.

Examination for Commission in the Royal Army Medical Corps.

Surgery. (Case for Commentary). — Wednesday, July 26, 1911. Commencing 11.30 a.m. Time allowed, 1½ hours. Read your Instructions.

A strong robust man, aged 29, a corn-porter by occupation, met with an accident on a Monday morning while walking along a plank unloading a grain-ship lying alongside the quay wall. A sack of corn was on his shoulder when he missed his step and fell into the hold of the ship, some 20 feet. He was picked up somewhat dazed and semi-conscious, but after some time he recovered sufficiently to be able to walk to his residence about a mile off. When he arrived home he went to bed, and the next morning, Tuesday, his brother brought him to the out-patient department of a general hospital. He sat in the waiting-room for a considerable time, and, not being attended to at once, he became very irritable and abusive to the resident officials. The resident surgeon, observing his condition and hearing his abusive language, came to the conclusion that he was under the influence of "drink," and ordered him out of the place if he did not keep quiet. He then left the hospital with his brother without being examined, and walked back to his home, remaining there that day, Tuesday, and the succeeding night. He was not exactly clear in his intellect, but took nourishment, and was irritable, restless, and talked somewhat incoherently. On Wednesday morning he was in the same condition, and his brother conveyed him in a cab to another general hospital, where he was seen immediately, as he had the history of a head injury.

He answered any questions he was asked, but with difficulty. He was at once admitted, and his condition was as follows: pulse 60, temperature normal. There was no escape of clear cerebro-spinal fluid from either ear, nor was there any escape of blood from the same situation. He had no cut or wound on the head. Shortly after being placed in bed he became unconscious, and lay in an apparently dreamy state, which was quickly followed by profound coma. The extremities on both sides became paralyzed, the face livid, and at times flushed. The pulse, which was full, slow, and labouring on admission, increased in rate, the skin became hot and sweating, he had stertorous and whiffing breathing. He passed no urine, and was constipated. He continued on in this state till Wednesday night. The same symptoms increased in severity, and he died about 10 o'clock p.m.

A *post-mortem* examination was made at the inquest which was held the next day, and disclosed extensive injuries.

Discuss the diagnostic significance of the symptoms during life, and mention any conditions that seem to you to account for them.

What, in your opinion, was the cause of his death?

Medicine (Case for Commentary).—Wednesday, July 26th, 1911. Commencing 10 a.m. (Time allowed, 1½ hours). Read your Instructions.

A well-developed man, aged 45, who had been accustomed to smoke a good deal and take freely of alcohol, suffered from an attack of influenza in March, 1909. At the end of three weeks he was convalescent, but all through the summer complained of feeling weak and of being out of sorts and wanting in energy. He was also troubled with an irritating paroxysmal cough, which gradually increased in severity. On September 9th, a motor car in which he was riding turned over on a hill, the patient was thrown out, falling on to the ground, another passenger falling across his chest. He was for a few hours much shaken and upset, but was able to continue his journey. A few days later he brought up a little blood by the mouth, was seen by a doctor, who confined him to his room for twenty-four hours only. On October 4, he again brought up through the mouth about a wineglassful of blood. On October 6 his condition was as follows:—There was marked general cyanosis of the face and ears, the neck was much swollen, and the veins of the neck on either side were engorged, especially on the left. Any exertion, such as moving in his bed, brought on a certain amount of dyspnœa. He complained at times of dull pain across the upper part of the chest, also over the right scapula. A careful examination of the heart and lungs was negative; the physical signs were normal. On October 17 it was noticed that the eyeballs were abnormally prominent, the other signs were slightly more marked, and in addition it was noticed that there was slight loss of resonance to the left of the mid-sternal line, opposite the second and third costosternal articulations extending on to the left side of the thorax over an area of about a square inch. It was also noticed that the air entry over the right lung was distinctly weaker than on the left.

In November it was noted that for some days past there had been a decided improvement, face less cyanosed, neck smaller, veins less prominent. On December 8 an X-ray photograph was taken, which showed a large shadow immediately above the heart, and occupying the greater part of the mediastinum. On February 11, 1910, a very distinct systolic bruit was noted to left of sternum, opposite the second and third costosternal articulations. From about this date he began to lose ground steadily, dyspnœa became more marked, he developed a pronounced inspiratory stridor, coughed up small quantities of blood-stained sputa at intervals, and rapidly lost flesh and strength. The pain across the upper part of the chest became more pronounced, the air entry over right side weaker, and he died early in April.

Discuss fully the differential diagnosis and treatment. Mention any other symptoms and physical signs you would watch for which might aid you in forming a correct diagnosis.

BIRTHS.

INKSON.—On July 7, 1911, at Tunbridge Wells, the wife of Major Inkson, V.C., R.A.M.C., Bangalore, India, of a daughter.

ARGLES.—On July 18, 1911, at Mussoorie, U.P., India, the wife of Captain R. L. Argles, of a son.

HARRISON.—At 33, Guildford Road, South Lambeth, on July 27, 1911, the wife of Major W. S. Harrison, R.A.M.C., of a daughter.

MARRIAGES.

SYMONS—BILLINGSLEY.—On Wednesday, June 14, 1911, at the residence of Arnold A. Grieg, Esq., Hill Crest, Amatikulu, by the Rev. F. J. Rhead Marsh, Captain Vivian Hood Symons, R.A.M.C., third son of Lieutenant-Colonel C. E. H. Symons, Ceylon, to Florence Mildred, youngest daughter of C. Billingsley, Esq., of The Kya, Talbot's Wood, Bournemouth.

JOHNSON—BULLEN.—At St. George's Church, Wellington, on July 26, 1911, Captain B. Johnson, R.A.M.C., St. Thomas' Mount, Madras, to Lilian Shirley, elder daughter of Major J. W. Bullen, R.A.M.C., and Mrs. Bullen, Iscoyd, Wellington.

GRANT—ROBERTS.—On August 15, at St. Edward's Church, Netley Abbey, Captain Montagu F. Grant, R.A.M.C., only son of Frederick and Mrs. Grant, of 169, Queen's Gate, S.W., to Winifred, eldest daughter of Thomas Roberts, late Bengal Civil Service, and Mrs. Roberts, of Ingleside, Netley Abbey, Hants.

DEATHS.

POTTINGER.—At Bareilly, on August 2, 1911, Lieutenant Denis Eldred Curwen Pottinger, M.B., R.A.M.C., aged 30 years. Lieutenant Pottinger entered the Service on August 1, 1908.

O'BRIEN.—At Southport, on August 13, Honorary Brigade-Surgeon Eugene Robert O'Brien, M.D., Surgeon-Lieutenant-Colonel, retired, late Army Medical Staff, aged 69 years. He entered the Service as an Assistant-Surgeon (Staff) on September 30, 1864, became Assistant-Surgeon 96th Foot, March 9, 1867: Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, September 30, 1876; Surgeon-Lieutenant-Colonel, Army Medical Staff, September 30, 1884, and retired with the honorary rank of Brigade-Surgeon, April, 18, 1885.

SCANLAN.—At Kerswell, Broadclyst, Devon, on August 12, 1911, Lieutenant-Colonel James Scanlan, M.B., retired, late Army Medical Staff, aged 64 years. He entered the Service as an Assistant-Surgeon (Staff) on October 1, 1868: became Assistant-Surgeon 14th Foot, January 29, 1870; Surgeon, Army Medical Department, on March 1, 1873; Surgeon-Major, October 1, 1880; Surgeon-Lieutenant-Colonel, Army Medical Staff, October 1, 1888, and retired on retired pay on October 17, 1888. His war service was: South African war, 1881; Transvaal Campaign.

CLIFTON.—At West Kensington, on August 16, 1911, Deputy-Surgeon-General Robert Walter Clifton, retired pay, late Army Medical Staff, aged 75 years. He entered the Service as an Assistant-Surgeon (Staff) on September 28, 1857; became Assistant-Surgeon, Royal Artillery, November 17, 1857; Surgeon (Staff), August 31, 1872; Surgeon, 33rd Foot, December 4, 1872; Surgeon-Major, Army Medical Department, March 1, 1873; Brigade-Surgeon, January 2, 1883; Deputy-Surgeon-General, June 21, 1887, and retired on retired pay April 11, 1888. His war service was: China War, 1860-1. Action of Sinho and capture of Taku Forts. Medal with clasp.

EXCHANGES, &c.

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* These are not arranged as Reprints, but appear precisely as in the Journal with any other matter that may happen to appear on the first and last pages of the particular excerpt ordered.

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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Lieutenant C. Clarke, Major C. F. Wanhill, Colonel N. Autelo, Major W. W. O. Beveridge, Captain A. G. Cummins, Colonel R. H. Firth, Serjeant D. J. Bell, Captain J. H. P. Graham, Captain A. G. McKendrick, I.M.S.

The following publications have been received:—

British: Sleeping Sickness Bureau, Transactions of the Society of Tropical Medicine and Hygiene, Guy's Hospital Gazette, Army and Navy Gazette, Journal of the Royal United Service Institution, The Public Health Journal (*Canada*), *The Journal of Tropical Medicine and Hygiene, Medical Press and Circular, The Journal of Meat and Milk Hygiene, The Indian Medical Gazette, The Australasian Medical Gazette, St. Thomas's Hospital Gazette, The Hospital, The Practitioner, Journal of the Royal Sanitary Institute, The Royal Engineers' Journal, The Shield, The Medical Review, The Lancet, St. Bartholomew's Hospital Journal, Public Health, Journal of the United Service Institution of India, Journal of the Royal Institute of Public Health, Red Cross and Ambulance News, The Indian Medical Journal, The Middlesex Hospital Journal, The Pasteur Institute of India.*

Foreign: Archiv für Schiffs- und Tropen-Hygiene, Archives de l'Institut Pasteur de Tunis, Annali di Medicina Navale e Coloniale, Giornale di Medicina Militare, Deutsche Militärärztliche Zeitschrift, Malaria e Malattie dei Paesi Caldi, Le Caducée, United States Naval Medical Bulletin, Japanese Medical Journal, Bulletin of the Johns Hopkins Hospital (Nos. 244 and 245), *Morskoi Vrach, Bulletin de l'Institut Pasteur, United States Department of Agriculture, Archives de Médecine et Pharmacie Navales.*

MANAGER'S NOTICES.

The Journal of the Royal Army Medical Corps is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

The Hon. Manager,
"Journal of the Royal Army Medical Corps,"
War Office, Whitehall, S.W.

JOURNAL

ROYAL ARMY MEDICAL CORPS.

Corps News.

OCTOBER, 1911.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Samuel R. Wills retires on retired pay, dated August 30, 1911.

Lieutenant-Colonel Wills entered the Service as a Surgeon, Medical Staff, on May 30, 1885, became Surgeon-Major, Army Medical Staff, on May 30, 1897, and Lieutenant-Colonel, Royal Army Medical Corps, on May 30, 1905. His war service is: Hazara Expedition, 1891, medal with clasp. Operations on North-West Frontier of India, 1897-8 with Tirah Expedition Force, medal with two clasps. South African War, 1899-1902. Relief of Ladysmith, including operations of January 17 to 24, 1900, and action at Spion Kop; operations of February 5 to 7, 1900, and action at Vaal Kranz; operations on Tugela Heights, February 14 to 27, 1900; operations in the Transvaal, December 1901 to May 31, 1902; Queen's medal with four clasps, King's medal with two clasps.

Major James C. Morgan to be Lieutenant-Colonel *vice* S. R Wills, retired, dated August 30, 1911.

The undermentioned Officers are seconded for service with the Egyptian Army, dated August 17, 1911; Captain Robert B. Black, M.B., Lieutenant Harry S. Ranken, M.B.

Captain Albert E. Hamerton, D.S.O., is seconded for service under the Colonial Office, dated July 20, 1911.

The undermentioned Lieutenants to be Captains, dated August 4, 1911: John James, Alfred C. H. Suhr, John E. Ellcome, Gerald J. Keane, Harold H. Blake, Robert M. Dickson, Frank Worthington, Frederick H Bradley, Alexander L. Stevenson, Bernard Varvill, Joseph W. Houston, Arthur Shepherd, Wilfred J. Dunn, Frank B. Dalgliesh, Malcolm Leckie, Spencer G. Walker, Charles E. L. Harding, Falkiner M. Hewson, Arthur L. Foster, Claude M. Rigby, Alan G. Wells, Alexander E. G. Fraser, Walter H. S. Burney, Thomas S. Eves, Leo Murphy, Arthur H. T. Davis, John S. McCombe, William J. Tobin, Campbell McQueen, Robert O'Kelly.

Captain Horace H. Kiddle is placed temporarily on the half-pay list on account of ill-health, dated September 2, 1911.

The undermentioned to be Lieutenants (on probation), dated July 28, 1911: Basil Hamilton Hebden Spence, William Balfour Laird, Douglas Walter Bruce, Herbert Stuart Blackmore, Edward Spencer Calthrop, Leonard Buckley, Lieutenant Francis Robert Bradley Skrimshire (from the 4th Battalion, the Hampshire Regiment), Richard Trevor Vivian, Thomas Edward Osmond, Ernest Cotton Deane, Stanley Parkinson Sykes, Robert Davidson, Edward George Huxley Cowen, Edward Bruce Allnutt, James May Elliott, Harry Campbell Todd, Maurice Drummond, Alexander Gillilan Johnson MacIlwaine, William Stewart, Frank Stuart Tamplin, Ivor Robert

Hudleston, Arthur Stanley Heale, Arthur John Ormsby Wigmore, Henry James Gordon Wells, Lieutenant William Leckie Webster (from the Royal Army Medical Corps, Special Reserve).

The undermentioned Lieutenants (on probation) are seconded under the provisions of Article 300, Royal Warrant for pay and promotion, 1909, dated July 28, 1911: William B. Laird, Francis R. B. Skrimshire, Thomas E. Osmond, Edward B. Allnutt, Harry C. Todd.

ARRIVALS HOME FOR DUTY.—From Jamaica: On August 27, Captain T. J. Potter, from special duty under the Colonial Office.

POSTINGS.—Lieutenant-Colonel W. H. Starr to the Northern Command. Major A. O. B. Wroughton to the Eastern Command. Captain G. Baillie, Captain T. J. Potter, and Lieutenant G. H. Stack to the London District, temporarily pending embarkation. Captain H. B. Connell to the Irish Command, temporarily pending embarkation.

Quartermaster and Honorary Captain R Scott to the Irish Command for duty in the Army Medical Stores, Dublin. Quartermaster and Honorary Captain F. Crookes to the Eastern Command for duty in the Army Medical Stores, Woolwich. Quartermaster and Honorary Major J. M. W. Beach to the Southern Command for duty.

TRANSFERS.- Lieutenant-Colonel J. C. Morgan, from the Irish to the Scottish Command. Major G. S. McLoughlin, D.S.O., from the Western to the Southern Command. Captain W. F. Tyndale, C.M.G., from the Irish to the Southern Command. Captain R. C. Wilmot, from the Southern to the Eastern Command.

TRANSFERS TO THE HOME ESTABLISHMENT.—From India on September 6: Lieutenant-Colonel W. H. Starr.

APPOINTMENTS.—Colonel T. M. Corker to be a Principal Medical Officer in India. Colonel W. G. A. Bedford, C.M.G., Principal Medical Officer, London District. Lieutenant-Colonel H. J. Barratt, to be an Administrative Medical Officer in India. Lieutenant-Colonel A. F. Russell, C.M.G., Principal Medical Officer, Egypt. Lieutenant-Colonel W. W. Pike, D.S.O., to be an Administrative Medical Officer in India. Lieutenant-Colonel W H. Starr, Charge of the Military Hospital, Lichfield. Lieutenant-Colonel J. C. Morgan, Charge of the Military Hospital, Glasgow. Major S. F. Clark, Medical Inspector of Recruits, Western Command. Major D. J. Collins, Sanitary Officer, Dublin. Captain J. H. Brunskill, Clinical Pathologist, Curragh. Captain S. B. Smith, Sanitary Officer, Belfast. Captain W. F. Tyndale, C.M.G., Sanitary Officer, Devonport. Captain R. C. Wilmot, Specialist in Ophthalmology, Colchester. Captain H. B. Kelly, Charge of the Military Families Hospital, Curragh. Captain A. C. H. Gray, Clinical Pathologist, Dublin. Captain P. J. Hanafin, Specialist in Ophthalmology, Dublin.

ARRIVALS HOME ON LEAVE.—Colonel R. Porter; Lieutenant-Colonel H. C. Thurston, C.M.G.; Majors T. B. Beach, C. E. P. Fowler, H. C. French, and C W. Mainprise; Captains W. Byam, W. J. Weston, F. C. Sampson, R. E. Todd, and G. Petit; Lieutenant W. E. Marshall.

Captain R. J. B. Buchanan, Clinical Pathologist, Alexandra Hospital, Cosham.

The undermentioned officers have been appointed Adjutants to Royal Army Medical Corps, Territorial Force, Schools of Instruction, viz.: Captains F. McLennan, R. N. Woodley, B. A. Craig, J. M. H. Conway, R. H. Bridges, J. M. M. Crawford, C. Bramhall, H. H. J. Fawcett, C. R. Sylvester Bradley, R. B. Hole, M. F. Grant, H. H. A. Emerson.

RETIRED PAY APPOINTMENTS.—The following retired pay appointments have been approved: Lieutenant-Colonel H. L. Battersby, Medical Charge at Ipswich; Lieutenant-Colonel E. Davis, Medical Charge at St. Peters, Jersey; Major B. F. Zimmerman, Medical Charge at Lancaster.

EMBARKATIONS.

For India.—On September 13, Lieutenant-Colonel R. W. Wright; Captain J. S. Bostock; Lieutenant J. R. Yourell.

For North China.— On September 8, Lieutenant-Colonel C. J. Macdonald; Captain W. J. Waters.

For Hong Kong.—On September 8, Lieutenant E. C. Lambkin.

For Malta.—On September 8, Major C. R. Evans; on September 13, Lieutenant-Colonel H. M. Sloggett.

For Egypt.—On September 13, Lieutenant A. D. Stirling.

For Gibraltar.—On September 13, Lieutenant W. G. Wright; Lieutenant J. J. D. Roche.

For West Africa.—On September 13, Lieutenant-Colonel A. A. Sutton, D.S.O.; Major A. L. A. Webb.

ROSTER FOR SERVICE ABROAD.—Exchanges of position on the roster between the undermentioned officers have been approved. Lieutenant-Colonels E. A. Burnside and J. C. Morgan; Majors L. P. More and L. N. Lloyd, D.S O.

Lieutenant-Colonel A. Dodd having notified his intention to retire, his name has been removed from the roster.

NOTES FROM ALDERSHOT.—Serjeant-Major Roberts, writes: "The Serjeants' Mess Annual Rifle Meeting took place at Ash Ranges near North Camp, on September 11 and 15. I append particulars of the committee, rules, and results, which, no doubt will be found very interesting, especially to members of the Corps who in the past have participated in this delightful outing.

"*Committee.*

"President: Staff-Serjeant J. M. Maxwell, 'B' Company Depot. Members: Staff-Serjeant W. Merchant Connaught Hospital, Serjeant P. Sproule, Cambridge Hospital; Serjeant Bugler R. Smith, 'A' Company, Depot; Serjeant F. A. Philbrook, 'C' Company, Depot.

"*Rules.*

"(1) (*a*) *Rifles.*—Rifles of Government pattern, and those as issued to the Corps must be used.

"(*b*) *Slings.*—The sling will be on the rifle and must be attached thereto according to regulation. It must not be used as an aid to shooting.

"(2) *Sights.*—Blackening or alteration of sights is not permitted, nor may any addition be made thereto. Orthoptics are not allowed.

"(3) *Dress.*—Uniform, Service dress; the wearing of leggings, puttees, or waistcoat optional.

"(4) *Hours of firing.*—Firing from 9 a.m. to 1 p.m., and 2.30 p.m. to 6 p.m., unless otherwise ordered.

"(5) *Order of Firing.*—On arriving at the firing point, competitors must obtain their ammunition, and then present their tickets to the Superintending Officer, who will detail them to a target. Any member loading before he is in a position to fire will be disqualified.

"(6) *Position.*—No artificial rests are allowed, but a competitor may use a waterproof sheet or great coat (not folded up but laid flat) as a protection from damp. No hole may be made in the ground to assist the competitor in firing.

"(7) *Coaching.*—Coaching and spotting are not allowed, except among competitors actually firing. No person shall be allowed to screen a competitor or his rifle from the sun or weather.

"(8) *Targets.*—Regulation figure targets.

"(9) *Marking.*—As in Muskety Regulations, Part I (1909), para. 495.

"(10) *Ties.*—These will be decided as follows: (1) By the fewest misses; (2) by the fewest outers; (3) by the fewest magpies; (4) by the value of each shot in inverse order, commencing at the longest range.

"(11) No persons under any circumstances may compete more than once in the same match.

"(12) *Challenging.*—The marking may be challenged before any other shot has been fired at the same target on the sum of 1s. being first deposited with the Range Officer. If, on examination, the marking in question is confirmed, the 1s. shall be forfeited without appeal; if, on the contrary, the objection proves well founded, the correct value will be signalled in the usual way, and the 1s. shall be returned to the competitor who has paid it, and the score altered in accordance with the decision received.

"Under no circumstances shall anyone from the firing point go up to examine the targets, except the Range Officer or a member of the Committee.

"(13) The cups themselves in matches 3 and 6 are not to be a handicap, but all prizes in these matches are to be on the handicap system.

"The same competitor cannot win both cups, but it will be left to his selection which cup he may take in the event of such being the case.

"(14) Any question which may arise and is not governed by the above rules will be decided by the Committee.

"*Match* 1: *Grouping Competition.*—2nd Class target with 4 in. bull's eye. Distance, 100 yards; position, any military; rounds, 5; size of grouping ring, 8 inches. Four prizes for four best groups: 1st, Serjeant Gregson; 2nd, Staff-Serjeant Maxwell; 3rd, Staff-Serjeant Merchant; 4th, Staff-Serjeant Ryan. Twenty-nine competitors: 5 tied, in the shoot-off best grouping rings were as above placed.

"*Match* 2: *Snap-shooting Competition* --Distance, 200 yards; position, any military; number of rounds, 7. *Conditions* —The target will be exposed for three seconds, seven times. Direct hits will only count one point each. The butts of rifles and forearms must rest on the ground until the target appears. Points will be deducted for infringement of this rule. 1st, 2nd, 3rd, and 4th prizes: 1st, Serjeant Gregson; 2nd, Serjeant-Major Drury; 3rd, Quartermaster-Serjeant Cox (R); 4th, Serjeant Thomas. Thirty-two competitors: 8 tied with 6 points each. In the shoot-off result as above placed.

"*Match* 3: '*Hammerton' Cup. Handicap.*—Nine rounds at 200, 500, and 600 yards. Position, any military. 1st, 2nd, 3rd, 4th, 5th, 6th, and 7th prizes:—

		Yards			Total	Handicap	Aggregate
		200,	500,	600			
Cup.	Staff-Serjt. Maxwell ..	29	30	24	83	Scratch	83 points.
1st Prize.	Serjt.-Major Drury ..	27	32	15	74	12	86 ,,
2nd Prize.	Staff-Serjt. Maxwell ..	29	30	24	83	Scratch	83 ,,
3rd Prize.	Serjt. Gregson ..	28	27	26	81	—	81 ,,
4th Prize.	Serjt.-Major Woollard	29	20	20	69	8	77 ,,
5th Prize.	Serjt. Winn	28	22	12	62	12	74 ,,
6th Prize.	Serjt.-Major Figg ..	23	22	16	61	8	69 ,,
7th Prize.	Serjt. Sproule ..	21	20	13	54	12	66 ,,

Inscription on Cup:
Serjeants' Recreation Club,
Medical Staff Corps,
Aldershot.

Challenge Cup
Presented by Messrs. Hammerton and Coy.
1892.

Year	Winner	Score	Year	Winner	Score
1892	2/C Staff-Serjt. Withers ..	77 points.	1902	No shoot.	
1893	Serjt.-Major H. G. Hassell	75 ,,	1903	2/C Staff-Serjt. Collier ..	80 points.
1894	Serjt.-Major T Steward	90 ,,	1904	,, ,, ,, ..	91 ,,
1895	2/C Staff-Serjt. Evenden	86 ,,	1905	Serjt. Fletcher	84 ,,
1896	Serjt. J. J. Jackson ..	89 ,,	1906	Staff-Serjt. Fletcher ..	87 ,,
1897	2/C Staff Serjt. Evenden	95 ,,	1907	,, ,, ...	90 ,,
1898	1/C ,, ,,	89 ,,	1908	Serjt. J. Hinton ..	86 ,,
1899	,, ,, ,,	90 ,,	1909	No shoot.	
1900	2/C Staff-Serjt. J. Cotter	81 ,,	1910	,,	
1901	Serjt. J. Johnson ..	83 ,,	1911	*Staff-Serjt. J. M. Maxwell	83 ,,

* Figure targets, value of Bull in previous years 5 points, present year 4 points.

"*Match* 4: *Rapid Fire Competition.*—Distance, 400 yards; target, 1st Class figure; Position, any military. Seven rounds in 50 seconds. The firing to be independent, and to be completed in 50 seconds from the command 'Fire.' Magazines to be charged with seven rounds, cut-off closed. The Superintending Officer will satisfy himself no magazine is loaded with more than seven rounds. He will terminate the firing by whistle. Four points will be deducted for each round fired after the whistle has been blown. 1st, 2nd, 3rd, 4th, and 5th prizes:—

1st Prize	Staff-Serjeant	Maxwell ..	5 bulls,	1 inner,	1 magpie	..	= 25 points.
2nd ,,	,,	Robinson ..	2 ,,	3 ,,	1 ,,	..	= 19 ,,
3rd ,,	Serjeant	Avery ..	2 ,,	2 ,,	1 ,,	1 outer	= 17 ,,
4th ,,	,,	Thomas ..	1 ,,	3 ,,	1 ,,	1 ,,	= 16 ,,
1st Prize	Staff-Serjeant	Merchant ..	2 ,,	1 ,,	2 ,,	2 ,,	= 15 ,,

Thirty-four competitors.

"*Match* 5: *Officers* v. *Serjeants.*—Teams to consist of seven a side. Seven rounds at 500 yards and seven rounds 'rapid firing' at 500 yards in 50 seconds.

Officers.		Independent	Rapid
Capt.	Cotterill	23	22
,,	Ryan	8	10
,,	Carter	12	3
Lieut.	Fretz	20	13
,,	Wilson	21	12
,,	Bowie	10	7
..	Simpson	10	3
	Total	104	70
	Grand total	174	

Serjeants.		Independent	Rapid
Qmr.-Sjt.	R. Cox	12	15
Staff-Sjt.	Merchant	9	9
,,	Maxwell	20	21
Serjeant	Gregson	25	20
,,	Thomas	6	16
,,	Averv	15	12
,,	Sproule	13	2
	Total	100	95
	Grand total	195	

"*Match* 6. '*Lilywhite' Cup. Handicap.*—Ten rounds at 500 yards, ten rounds at 600 yards; position, any military. 1st, 2nd, 3rd, 4th, 5th, 6th, and 7th prizes:—

		Yards		Total	Handicap	Aggregate
		500	600			
Cup	Serjt. Gregson	35	25	60	Scratch	60 points.
1st Prize.	,, Thomas	38	20	58	4	62 ,,
2nd Prize.	,, Gregson	35	25	60	Scratch	60
3rd Prize.	,, Winn	23	23	46	12	58 ,,
4th Prize.	Serjt.-Major Cox	25	27	52	Scratch	52 ,,
5th Prize.	,, Bollen	18	22	40	12	52 ,,
6th Prize.	Staff-Serjt. Squire	20	27	47	4	51 ,,
7th Prize.	Serjt.-Major Figg	23	19	42	8	50 ,,

Inscription on Cup:
Presented to Serjeants' Mess,
Medical Staff Corps,
from
Serjeants' Mess, 2nd Battalion, E. Lancashire Regiment,
as a token of good comradeship
during the stay in Aldershot,
1895---1897.

Year	Winner	Score	Year	Winner	Score
1897	Staff-Serjt. Evenden	181 points.	1905	Serjt. J. Hinton	86 points.
1898	,, ,,	174 ,,	1906	,, ,,	87 ,,
1899	,, ,,	172 ,,	1907	,, ,,	84 ,,
1900	Staff-Serjt. Cotter	168 ,,	1908	Staff-Serjt. Fletcher	77 ,,
1901	,, Jackson	84 ,,	1909	No shoot.	
1902	No shoot.		1910	,,	
1903	Staff-Serjt. G. Collier	82 ,,	1911	Serjt. Gregson	60 ,,
1904	,, ,,	92 ,,			

"*Pool Shooting* -- All day. At the range in occupation at the time. 200, 400, 500, and 600 yards. Bull's-eye target.

"*Winners of Pool Shooting* —At 200 yards, Qmr.-Serjeant Cox and Serjeant Gregson, 1 bull each. At 400 yards, Qmr.-Serjeant R. Cox, 1 bull. At 500 yards, Staff-Serjeant Maxwell, 2 bulls; Serjt.-Major Figg, Staff-Serjeant Merchant, and Serjeant Gregson, 1 bull each.

"The weather was glorious and the conditions favourable to good shooting. The interest displayed by the neophytes was wonderful. We started very timidly, but gradually grew so bold that the target was hit on many occasions. Quite a feature of the shooting for the Hammerton Cup occurred at the 500 yards range, S. M. Drury scoring 8 bulls out of 9 shots, the other being signalled as a miss.

"The Serjeants' Mess Tennis Tournament, which has been carried on for some time past, terminated recently.

"The events resulted as follows:—

"*Singles* – Serjeant-Major Woollard beat S. M. Figg.

"*Mixed Doubles*—Serjeant-Major and Mrs. Woollard beat Quartermaster-Serjeant Cox and Miss Pridgeon.

"*Gentlemen's Doubles.*—Serjeant-Major Woollard and Quartermaster-Serjeant Hook beat Serjeant-Major Bollen and Quartermaster-Serjeant Enwright.

"Serjeant-Major C. Drury has joined the Cambridge Hospital, in relief of Serjeant

Major Taylor who has proceeded to Rochester Row for duty. Serjeant-Major F. J. Filmer has joined the Connaught Hospital, in relief of Serjeant-Major T. Grenfell. Serjeant-Major T. Grenfell has been appointed to the invaliding depot, Woolwich, *vice* Serjeant-Major Godman. Prior to his departure from the Connaught Hospital, where he has served for the last three years, he was handed a substantial and useful souvenir, which will remind him of the happy times he has spent in Hampshire.

"The Corps here of late has done very well in the cricket world. The first team has had a fairly successful season. In my next notes I hope to give a synopsis of their doings. The Inter-Company Cricket League languished a little, chiefly owing to its members being away on 'Strike duty,' brigade, and other trainings, &c. Congratulations are, however, extended to Nos. 1 and 2 Companies, the latter having gone through their games undefeated, and the former only once being in arrears, their victors being No. 2 Company.

"No. 1 Company being at the Cambridge Hospital and No. 2 Company at the Connaught Hospital, keen friendly rivalry takes place on such occasions. In the game under notice it will be seen from the appended scores that the victory was not by any means an overwhelming one.

No. 1 Company.	
Corporal Walton	6
,, Breeze	1
Private Gillham	26
Serjeant-Major Bollen	1
Lance-Corporal Prince	30
Captain Bostock	9
Major Mangin	0
Quartermaster-Serjeant Taylor	0
Corporal Hazell	0
Boy Taylor	1
Serjeant Leggett (not out)	1
Extras	8
	83

No. 2 Company.	
Corporal Fish	30
Private Ellis	18
Serjeant-Major Roberts	3
Captain Greenwood	9
Private Johnson	1
Lance-Corporal Walkley	22
Private Griffiths	0
,, Gardiner	5
Corporal Haigh	5
Serjeant Miller	6
Corporal Smith (not out)	4
Extras	0
	103

"During the series of games played by No. 2 Company the most exciting without doubt was that with 'B' Company.

'B' Company.	1st innings	2nd innings
Serjeant Garbidge	0	1
,, March	8	19
Private Taylor	28	0
,, Isherwood	0	3
,, Hughes	3	0
,, Watson	0	2
,, Tapp	0	9
,, Wilkins	1	4
,, Southall	4	0
,, Brotherstone	3	0
,, Chaffe	2	5
Extras	9	0
Totals	58	43

No. 2 Company.	1st innings	2nd innings
Captain Greenwood	3	not bat
Corporal Fish	0	0
Private Griffiths	13	20
,, Ellis	0	7
Lance-Corporal Walkley	5	20
Serjeant Miller	5	7
Serjeant-Major Roberts	6	10
Corporal Smith	1	not bat
,, Haigh	0	,,
Private Johnson	0	5
,, Gardiner	0	6
Extras	2	11
Totals	35	86

"When the last innings was entered on, only forty-five minutes remained for play, 68 runs being required to win. Instructions were given 'Hit out, or get out,' result, the necessary number of runs were obtained three minutes from time for the loss of 6 wickets. On August 30, Nos. 2 and 3 Companies met in the Inter-Company League, the match resulting in another victory for No. 2. No. 3 Company batted first and were dismissed for 45.

"No. 2 Company responded with 107 runs, without the loss of a wicket, Corporal Fish and Private Griffiths batting splendidly, Fish making 67 and Griffiths 40 in fifty minutes, a really fine performance.

"No. 18988 Corporal Haigh will shortly embark for South Africa, and No. 1810 Private Griffiths for Malta. These two formed the left wing of the last winners of the Harwood Cup. They are both good football players and play cricket very well. The members of the Connaught Hospital are sorry to lose them.

"The return cricket fixture, Officers *versus* Serjeants of the Corps, took place on the Corps Ground on the 7th inst , under quite tropical conditions. Past players of this annual encounter will kindly note that on this occasion the result was a disastrous defeat of the Serjeants.

SCORES.

OFFICERS.		SERJEANTS.		
Lieutenant Bowie	2	Serjeant-Major Roberts	2 ..	18
Major Ross	6	Serjeant Avory ..	0 ..	1
Captain Ryan	7	Serjeant-Major Bollen	4 ..	2
,, Cotterill	0	Serjeant Taylor ..	1 ..	1
Major Fordo	4	Serjeant Major Drury	12 ..	2
Captain Greenwood	13	Serjeant McConn ..	4 ..	·12
Lieutenant Wilson	22	,, Garbett-Burbidge ..	12 ..	7
,, Simpson	0			
Major Langstaff	19	Quartermaster-Serjt. Cox	4	.. not bat
,, Houghton . .	6	Serjeant Heggie ..	3 ..	,,
Captain Bostock	40	Serjeant Pacey ..	0 ..	,,
Extras	14	Serjeant Miller ..	5 ..	12
		Extras	12 ..	4
Totals	133	Totals ..	59	59
		Full total..	118	

"Comment is unnecessary, except to offer congratulations to the officers on at last overcoming their opponents, this, I believe, being their initial victory in these games.

"Much sympathy has been expressed with Serjeant Glynn, R.A.M.C., Instructor of Cookery at Cambridge Hospital, at the loss he has sustained by the death of his wife, which took place on Sunday, August 27, at the age of 32. The funeral took place on August 30 at the Military Cemetery. Six Serjeants of the Corps acted as pall-bearers. Amongst the many floral tributes were tokens from the members of the Serjeants' Mess, from the Corporals' Mess and from the women of the Corps.

"General regret has been expressed at the death of No. 5129 Private C. E. Nichols, R.A.M.C., from 'meningitis.' Deceased had only served on the Connaught Hospital for nine months; he was a quiet, unassuming, and promising young soldier."

NOTES FROM WOOLWICH.—Major T. McDermott writes: "Our new mess has been in existence for fourteen months and no reference to it has appeared in the CORPS NEWS.

"The mess building has two field officers' quarters and ten quarters for other officers. It is a great improvement on the old conditions under which we lived on The Common. Life is much more comfortable, and we are all much more in touch with one another.

"Though there is still room for improvement in the mess, much has been done. Not the least has been the laying out of the grounds. A lawn tennis court should come later on. We are indebted to the old Woolwich Mess for a good collection of cups, plate, and table service, and we owe a debt of gratitude to the particular officers of the Corps who were the means of keeping these things for us. Brother officers have treated us kindly. Lieutenant Colonel H. N. Thompson, D.S.O., and officers, Royal Army Medical Corps, Lucknow, presented the mess with a fine card rack. Colonel K. Ray (R.P.) presented the complete paraphernalia for 'Snookay,' a game all the more acceptable on account of its being Colonel Ray's own invention. He also gave a clock. Colonel W. G. Birrell and Lieutenant-Colonel H. Cocks gave artist s proof engravings. Lieutenant-Colonel C. T. Blackwell presented a clock, and Lieutenant-Colonel J. B. Wilson and Major T. McDermott gave Giles' Pigsticking pictures. Major J. C. B. Statham has lent us a large and really good collection of heads shot by him in Portuguese East Africa, and we have hopes that his present trip to the Rockies may benefit us still further.

"During the year much lawn tennis has been played on the Herbert Hospital courts, and monthly 'At Homes' were given by the members of the Tennis Club.

"The Royal Army Medical Corps Badminton Club which Major Führ has again consented to run promises to have a successful season. The Drill Hall in which we play is kindly lent by Lieutenant-Colonel A. S. Greenway and officers, 4th London Division, Royal Army Medical Corps (T.).

"Many changes have taken place among our *personnel* lately. The most important has been the arrival of our present Administrative Medical Officer, Colonel R. W. Ford, D.S.O., in relief of Colonel W. G. Birrell transferred to Dover District.

"Miss A. Nixon is now Matron of the Royal Herbert Hospital instead of Miss Russell, R.R.C., who has retired after a distinguished career in the Queen Alexandra's Imperial Military Nursing Service.

"ANNUAL SPORTS.

"Serjeant-Major Green sends the following account A somewhat belated report of this event will, I am sure, be of interest to many of the Corps, especially those of our comrades who have served at Woolwich during the past few years

"As usual the events took place in the Royal Herbert Hospital grounds, and with ideal weather, such as it was on August 3 when the sports were held, a most delightful day was spent.

"Colonel Ford, D.S.O., the Administrative Medical Officer, and the Officers of the Corps were 'At Home' to their friends during the afternoon, and tea and refreshments were served from two marquees in the grounds under arrangements made by the Officers' Mess Staff.

"The members of the Serjeants' Mess were also 'At Home' to their friends and provided tea for some 120 guests, the tea arrangements being exceedingly well arranged by Quartermaster-Serjeant Hurrell and Serjeant Court as a Sub-Committee.

"The rank and file had their 'At Home' and entertained from 120 to 150 friends and relations in an immense marquee kindly lent by Messrs. Simonds for the purpose, the catering being under the management of Mr. Delany (ex-Quartermaster-Serjeant), our esteemed canteen manager.

"The programme and results were as follows —

PROGRAMME.

(1) Kicking the football: 1st, Private Andrews (49 yds.), writing desk; 2nd, Private Snow, silver-mounted cigarette case; 3rd, Private Grimley, set hall brushes.

(2) Putting the shot: 1st, Private Kerby (30 ft. 6 in.), clock; 2nd, Private Jane (29 ft. 9 in.), set hair brushes.

(3) Throwing the cricket ball: 1st, Serjeant Dell, set hair brushes; 2nd, Private Harding, writing desk.

(4) Tilting the bucket: Privates Horsnell and Healy, cigarette holders; Privates Boyes and Terry, silver pencil cases.

(5) Boys' races: were won by Allan Parton 1, Cyril Green 2, Stanley Ross 3, Donovan Parton 1, Fred Smith 2, Reggie Maye 3.

(6) Long Jump: 1st, Private Gospell, brass inkstand; 2nd, Private Wellburn, brass clock.

(7) Mile flat race · 1st, Private Wood, dressing bag; 2nd, Private Harding, brass inkstand; 3rd, Warner, clock.

(8) Sack race: 1st, Private Henry, inkstand; 2nd, Private Sims, case hair brushes.

(9) Three-legged race: 1st, Privates Wellburn and Wood, two cigarette cases; 2nd, Privates Jane and Hill, two razors in cases.

(10) Quarter mile flat race: 1st, Private Wood, dressing case; 2nd, Private Strange, Gem safety razor; 3rd, Private Henry, clock.

(11) Bucket of water race: 1st, Bugler Tuson, cigarette case; 2nd, Private Evans, cigarette case.

(12) Potato race; 1st, Private Sims, barometer; 2nd, Sergeant Thompson, spirit flask; 3rd, Private Wellburn, inkstand.

(13) Slow bicycle race: 1st, Bugler Tuson, bicycle lamp; 2nd, Private Hills, shaving set; 3rd, Private Snow, razor.

(14) 100 yards flat race: 1st, Private Wellburn, dressing case; 2nd, Private Strange, japanese cigarette case; 3rd, Private Henry, case of razors.

(15) Ladies' Handicaps: (Thread and needle); 1st, Mrs. Arnold; 2nd, Mrs. Wooten; 3rd, Miss Fry. Flirtation, 1st, Mrs. Hunt; 2nd, Mrs. Green; 3rd, Mrs. Sidebotham.

(16) Girls' races: Winnie Green, Dolly Arnold, Edith Maye and Florrie Read.

(17) Half-mile flat race: 1st, Private Wood, carriage clock; 2nd, Private Henry, brass inkstand; 3rd, Private Hazzard, shaving mirror.

(18) Veterans' race: 1st, Private Snow, clock; 2nd, Private Billington, pair silver salt cellers.

(19) Egg and spoon race (costume): 1st, Private Kerby (as Maria), razor and case; 2nd, Private Welch (as model boy scout), clock.

(20) 220 yards flat race: 1st, Private Strange, inkstand; 2nd, Private Snow, brass clock; 3rd, Private Henry, Jap cigarette box.

(21) Prize ring; 1st, Private Sims, shaving set; 2nd, Private Warner, cigarette case.

(22) R.A. band race: 1st, bandsman Burdett, set hall brushes; 2nd, bandsman Coulstock, case hair brushes; 3rd, bandsman Martin, electro-plated butter dish.

(23) Cuddy fighting 1st, Private Jaue and bugler Lever, two Calabash pipes; 2nd, Privates Batchelor and Morgan, two tobacco pouches.

(24) Soda and bun race · 1st, Private Warner, clock; 2nd, Private Andrews, inkstand; 3rd, bugler Tuson.

(25) Boot race 1st, Private Andrews, clock 2nd, Private Herby, set of hair brushes.

(26) Mop fighting . Privates Grimley and Sims, two silver-mounted walking sticks.

(27) Tug of war (final): No. 1 Room beat 19 Hut in the final pull.

(28) Relay race: 1st, Privates Harding, Snow and Strange; 2nd, Privates Wood, Warnes and Wellburn, silver mounted canes each

(29) Consolation race: 1st, Private Warner; 2nd, Jameson; and 3rd, Staff-Serjeant Hunt.

(30) Stretcher drill competition.

" All preliminary heats having been contested on the two previous days, the finals only were left for the Sports day proper, and no one present could have desired to see better contested events.

" We started punctually at 10 a.m., and with the exception of an hour and a half for lunch, and half an hour for tea, everything went swimmingly without intermission up to 7 p.m.

" The flat races had close finishes and the times were very good, especially considering certain disadvantages of the track on which they were run.

" Much amusement was caused by some of the events, such as Tilting the Bucket, the Bucket of Water, Boot, Costume, Soda and Bun Races, Cuddy Fighting, and Prize Ring.

" In the Ladies' Egg and Spoon Race, which was a handicap of 100 yards, ladies received a yard's start for every year of age over twenty, which required a little calculation on the part of the starter and starters.

" By the kind permission of the officers of the Royal Artillery, the Royal Artillery Band, some fifty strong, under the able conductorship of Serjeant Major Dawes, played at intervals from 3 p.m. to 7 p.m., and gave us the following delightful programme, which needless to say contributed greatly to the general success of the day's proceedings .-

PROGRAMME OF MUSIC.

1.	*March*	'Salute the Standard'	*Safroni*
2.	*Selection*	'The Arcadians'	*Monckton*
3.	*Valse*	'Remembrance'	*Joyce*
4.	*Intermezzo*	'On the Bosphorus'	*Lincke*
5.	*Piccolo Solo*	'The Wren'	*Damáre*
6.	*Selection*	'The Chocolate Soldier'	*Strauss*
7.	*Morceau*	'In the Shadows'	*Finck*
8.	*Bolero*	'Spanish Dance'	*Ravina*
9.	*Selection*	'The Girl in the Train'	*Fall*
10.	*Alaskan Love Song*	'Cocheco'	*Reeves*
11.	*Selection*	'A Life on the Ocean'	*Binding*
12.	*Finale*	'Poltergeister'	*Faust*

'GOD SAVE THE KING.'

Conductor—Serjeant-Major G. Dawes.

" Thanks to the very liberal support given us by the officers, the lists of events and the prize list were considerably augmented this year, and considering our comparatively small community, I think we may venture to say we can compare very favourably with the other Corps in the garrison from the annual sports point of view.

"Mrs. Ford kindly presented the prizes at the conclusion of the sports amidst much cheering and clapping.

"Cheers were given for the Administrative Medical Officer, the Commanding Officer, and the other officers, also for the ladies, and for the Committee.

"Our Sports Committee was comprised as follows:—

"*President.*—Major T. P. Jones (O.C. Companies).

"*Members.*—Lieutenant H. R. Edwards; Serjeant-Major R. H. Green; Serjeants A. Dell, J. C. Dunn and H. L. Thompson; Corporals C. Hearn and Gurnsey; Lance-Corporal Cairns; Privates Andrews, Appleyard, Croker, Harding, Walsh and Welch.

"STRETCHER DRILL AND FIRST AID COMPETITION.

"A Stretcher Drill and First Aid Competition was held at Headquarters last month, more or less in conjunction with the Sports, but on a different day, and as it was a keenly contested one, perhaps it may interest some of our readers to know how it was conducted.

Nine squads took part in the competition with a corporal as No. 4 of each squad.

Maximum points were allowed as follows.—

For the cleanest and smartest turned out squad, 8 points.

For smartness and precision in combined drill, 20 points.

For First Aid work 1, 2, 3 and 4, bearers, each 10 points.

For time, 12 points.

This gives an aggregate of 80 marks obtainable.

No. 1 bearer had to dress a wound of the left foot (1st Field Dressing).

No. 2 bearer had to apply splints, &c., to a left fractured thigh.

No. 3 bearer had to bandage a wound on the left side of the head (triangular).

No. 4 bearer had to put up a fractured clavicle (R).

"Captain Smallman, Lieutenant Edwards and Lieutenant Comyn acted as judges, and they had to go into minute details before deciding that on the highest aggregate of marks obtained the squad under Corporal Wells (with Privates Andrews, Jane, Horsnell, Stocker, and Harding), came first with 67 points, whilst Corporal Spark's squad (with bearers Privates Coughlin, Gospell, Newell, Richards and Williams), came second with 65 points, followed closely with 3 squads with 64 points, 2 squads with 63 points, 1 squad with 61 points, and 1 with 56 points.

"The competition was very keen, the more so as each squad had equal chances of success. There was no opportunity for previous squad practice, as the squads were detailed as they sized on the parade ground prior to commencing the exercises. The prizes for the winning squad were a razor and case each, and for the second squad a fountain pen each.

"GARDEN PARTY.

"A most enjoyable afternoon was spent on August 24 by the wives of the married Warrant Officers and N.C.O.s, and men of the Corps at Woolwich, when Mrs. Jones held a Garden Party for their entertainment at Herbert House, the residence of Major Jones (the Registrar and Officer Commanding Companies).

"The afternoon commenced with an excellent tea on the lawn, at 4 p.m. Then followed an open-air musical entertainment and sketch, which were much appreciated. This over, much amusement was caused by 'a Farmyard Race' and 'Competition Test of the Five Senses.' This was one of several such entertainments arranged by Mrs Jones and other officers' ladies to bring our folks in touch with each other, as they are rather scattered in Woolwich and its suburbs.

"The prizes presented for the competition and the race were well chosen and much appreciated.

"The weather and the surroundings were ideal for the purpose and altogether it was a most happy gathering."

NOTES FROM TIDWORTH PARK.—Lieutenant and Quartermaster C. W. Kinsella, R.A.M.C., writes: "On August 2, the second period of the Camp of Instruction was opened by the arrival of officers and men, sufficient to form two sections, the officers being Majors C. B. Lawson and Packer; Captains Carlyon, Henderson, and Jones; and Lieutenant Stringer.

"The first day was devoted to taking over equipment, followed the day after by preparation in field work with a view to joining with a detachment of the Women's Voluntary Aid Society from Winchester for field operations with the Officers' Training Corps.

"On August 4 the ladies arrived, twenty-five strong, and under arrangements made by Major Begbie were distributed: eight to the collecting and dressing station, four to ambulances, three to the operating tent, four to ward tents, two to clerical duties, and four as cooks.

"A demonstration of loading and unloading ambulances, with a visit to a fully equipped tent division, was followed by collecting wounded from the hillside, the rendering of first aid, &c., and the after treatment of casualties at the dressing station. The lady cooks meanwhile were taken in hand by the quartermaster and initiated into the mysteries of field cooking, trench kitchens, dixies, incinerators, &c.

"About 3 p.m. operations ceased and discussion and criticism of the day's work followed.

"On the following day we accompanied a force attacking a defended position and here the conduct of the dressing station was left entirely to the ladies, who acquitted themselves very well.

"Judging by the following extract from the *Hampshire Observer* they thoroughly appreciated our efforts. —

"'V.A.D. HANTS (36) BRITISH RED CROSS SOCIETY IN CAMP BY M. GOULD, HON SEC.

"'Leave having been given by Sir Charles Douglas (Southern Command) and confirmed by the War Office, thanks to the kind offices of Major the Hon. G. V. Baring, M.P., the detachment entrained at Winchester at 2.21 on Thursday, August 3.

"'At Tidworth we were met by three ambulance waggons and a mounted orderly, who took us to our camp, which consisted of twelve bell tents, each fitted with two beds, consisting of a stretcher, straw palliasse and bolster, flat pillow, four Army blankets and one sheet, and a chair. A mess tent and ante-room, and a washing tent, outside which was a double standpipe, from which members might draw water for their ablutions into zinc tubs.

"'The camp was beautifully situated behind a belt of trees, which separated it from the Officers' Training Corps camp, with a wide view to the north-east, and a ride between two woods leading up to the sunset in the west.

"'Major S. Vincent Ryan, R.A.M.C.(T), attached to the Junior Division, Officers' Training Corps Camp, then instructed us in the management of tents and various amenities of camp life.

"'Sleep did not visit the camp in great measure that night, but *reveille* found us ready to meet the day with undiminished spirits. Breakfast at 7.15, tent inspection at 8.15, ushered in the day, and at 8 30 we were paraded ready to board the ambulance waggons, which were to take us to the Royal Army Medical Corps camp, where we expected to be shown their methods of working, and spend an instructive but leisurely morning, but the authorities decreed otherwise. Major Begbie, R.A.M.C., Commandant of the Royal Army Medical Corps camp, met us and informed us that wounded were lying out on the hillsides, and we were to perform first aid and hospital work for them. Some of us were sent off to outlying collecting stations with such appliances as we could hastily grasp, others remained to man the hospitals. Triangular bandages, roller bandages, straps, sticks, stones, and pocket handkerchiefs were requisitioned. The neatness so much practised at home was perforce discarded, thanks to a tearing wind, which whisked aprons, dressings, and bandages about our heads, and to the impetuous doctors. 'Work like greased lightning, use whatever you lay hands on first, don't try to be neat,' said one After about an hour of crowded life, the awful ordeal came when the wounded were laid in rows, and those who had rendered first aid called upon to give reasons for their treatment, and received criticism. Then tents were struck, effects packed, and our ambulance conveyed us 'home' to lunch.

"'Early to bed' was the order of the day, and this time we all enjoyed a good night s rest, and woke ready for the fray. Punctually at 8.30 we again paraded, and entered our ambulance waggons as they drew up. Arrived at the scene of action the tents were not yet pitched, but we found full occupation in preparing blankets, palliasses, stuffing pillow cases with hay, &c., until they were ready for our occupation, and then we were soon ready for our patients. Colonel O'Donnell also inspected, and expressed himself delighted with the equipment and general workmanlike look of the hospitals.

"'Tents cleared and struck, we were paraded, and received with joy a few kindly words of commendation and encouragement from Major Begbie.

"'After lunch we marched to the parade ground, and were formed up immediately in the rear of the saluting point, where Sir Henry Rawlinson was holding an inspection. when the 3,500 boys marched past in companies. This was somewhat cut short by the rain, and we were glad of our much-despised and often-abused coats.'

"I think the above extract shows that the ladies detachment spent a pleasant and profitable time in camp.

" August 7 and 8 were devoted to field exercises, drills, and lectures on map reading and sanitation.

" On August 9, moving off at 5 a.m. we accompanied the 3rd Division under Sir H. Rawlinson, to Knighton and Alton Downs, where live ammunition and shell were used against tiles representing defenders. The several arms were kept to safety zones by a series of alignments and conducting officers and by signalling to gunners and fire commanders.

" The tent sub-division of 'A' Section established a collecting station at Lark Hill, while 'B' Section moved on and did likewise at Roundhead Farm. The bearer sub-divisions cautiously searched for the tallied wounded (5 per cent.) and also brought in several severe cases of heat exhaustion, scarcely to be wondered at on the hottest day of a hot summer

" Field kitchens were prepared and tea, bovril, &c., freely distributed.

" Sir H. Rawlinson was good enough to award unstinted praise.

" Packing up about 4.30 p m. camp was reached about 7.30 p.m., after a trying day and a march of thirty miles, during which only two of the Royal Army Medical Corps were rendered *hors de-combat*.

" The next two days were devoted to routine drills and lectures, and on August 12 the 'digging area' was visited, kitchens, latrines, &c , being dug as for the first party

" On August 14, another field day was held with the 7th Infantry Brigade, practical map reading following in the evening.

"On August 15 Surgeon General Whitehead, P.M O., S.C , made his inspection and saw the bearer sub-divisions at work by signal (whistle), while the tent sub-divisions undertook a dressing station competition which the Surgeon General kindly judged, awarding the victory (gained by two marks) to 'B' Section (Major H. D. Packer and Serjeant Hurst).

" Life was too strenuous during this second period to admit of many social events, but the officers were 'At Home' to afternoon tea on August 11, when they were favoured with the company of Surgeon-General and Mrs. Whitehead, Lieutenant-Colonel and Mrs Rowan, and many officers and ladies of the Tidworth Garrison.

" On August 15 the men held a successful 'smoker,' the officers attending in force, and at which the vocal efforts of Corporal Plant and the Quartermaster found much favour.

" August 16 saw the equipment handed in, but the order to disperse to stations was cancelled, and, instead of preparing to receive further classes from the remaining commands, the next few days were spent in despatching officers and men to various units for strike duty, the camp being finally closed on August 23.

" Amongst those who attended the camp of 1911 few can have any but pleasant recollections, and there can be no doubt that its sphere of usefulness might with advantage be much extended. Some new cooking methods were tried, and these I have, with the Editor's kind permission, discussed elsewhere "

NOTES FROM MALTA. – Serjeant-Major Collard, writes . " The only Royal Army Medical Corps dinghy the 'Midget' won the first series of races and tied for first place in the second series of races of the Mediterranean Skiff Club.

" His Excellency the Governor has consented to become Commodore of the Club, and has offered a challenge cup for competition next year. Captain P. Stewart, R.A.M.C., is the Hon Secretary of the Club, and also owns the 'Midget.'

"The swimming here causes a great deal of interest , twenty-seven N.C.Os. and men obtained the 1 mile certificate during the month.

"These certificates may be a useful addition for men seeking employment on return to civil life, such as 'beach inspectors,' and 'bath attendants.'

"All concerned are well pleased at the splendid result for Malta at the last examination for A.F.C. 344.

THE SOLDIERS' CUP.

Somerset Light Infantry v *Royal Army Medical Corps.*

" These teams played on Thursday, Friday and Saturday, August 17, 18 and 19, on No. 1 Ground Marsa.

" The Medicals won the toss and put their opponents in to bat.

" The real excitement of the match began on Saturday, the Royal Army Medical Corps requiring 116 to win. Could it be done? The Serjeant-Major and Tipping opened the defence, the former failed to survive 13 and was replaced by Hutchings who did not score, 13—2—0. Sayers joined Tipping whose wicket fell for 30—3—2. Talbot and Sayers made an advance to 50, when Sayers was caught by Marney off Booth 50—4—15. The Light Bobs were hopeful! Martin was next in and another big stride was made to 74, when Martin was bowled by Mattock for 18. Staff was next in and remained till the end not out 18. Burns was bowled by Marney 97—7—4 and Grogan was caught by Harley off Mattock 101—8—2. The Royal Army Medical Corps were getting anxious. Brownsell joined Staff who continued to tip and run for singles, but the old soldier was eventually run out without scoring 106—9—0. Corporal Turner was the last hope of the Medicals—he played carefully with Staff, and at length, with the aid of 23 extras, the desired number was reached and the Medicals won by a wicket. Marney took six wickets and Mattock two.

"Seldom has a closer match been played on the Marsa; the nearest approach being the Governor's Cup match between the Somersets and the Devons; on that occasion fortune favoured the Somersets; this time she smiled on the Royal Army Medical Corps, who now meet the Royal Garrison Artillery Central in the semi final.

Somerset Light Infantry.

1st Innings.		*2nd Innings.*	
Bandsman Hawkins, b. Hutchings	7	Bandsman Hawkins, c. Huntingford, b. Grogan	0
Private Snow, b. Grogan	7	Private Snow, c. and b. Hutchings	0
Colour-Serjeant Mattock, c. Hutchings, b. Talbot	49	Colour-Serjt. Mattock, c. and b. Grogan	0
Corpl. Booth, c. Tipping, b. Hutchings	51	Corporal Booth, b. Hutchings	27
Serjeant Buckley, b. Hutchings	27	Serjeant Buckley, b. Hutchings	27
Private Pearse, b. Martin	0	Private Pearse, c. Sayers, b. Grogan	2
,, Harley, run out	0	,, Harley, c. Tipping, b, Grogan	9
,, Marney, s. Sayers, b. Martin	7	,, Marney, c. Sayers, b. Hutchings	3
,, Connor, b Hutchings	1	,, Connor, c. Talbot, b. Martin	7
,, Vasey, c. Burns, b. Martin	7	,, Vasey, c. Talbot, b. Martin	9
,, Priddle, not out	1	,, Priddle, not out	3
Extras	6	Extras	4
Total	156	Total	91

Royal Army Medical Corps.

1st Innings.		*2nd Innings.*	
Corporal Martin, b. Mattock	4	Serjeant-Major Huntingford, c and b. Marney	9
Private Sayers, b. Mattock	6	Private Tipping, c Harley, b. Marney	2
Serjeant Talbot, b. Marney	1	Corpl. Hutchings, c. Snow, b. Marney	0
Corporal Staff, b. Mattock	15	Private Sayers, c. Booth, b. Marney	15
Serjt.-Major Huntingford, b. Mattock	13	Serjeant Talbot, c. Harley, b. Marney	17
Corporal Hutchings, c. Buckley, b. Mattock	16	Corporal Martin, b. Mattock	18
Private Tipping, run out	1	,, Staff, not out	18
,, Burns, b. Connor	42	Private Burns, b. Marney	4
,, Brownsell, c. Booth, b. Marney	0	,, Grogan, c. Harley, b. Mattock	2
Corporal Turner, c. Booth, b. Marney	0	,, Brownsell, run out	0
Private Grogan, not out	21	Corporal Turner, not out	8
Extras	18	Extras	23
Total	132	Total	116

Friendly Match.

Somerset Light Infantry v. *Royal Army Medical Corps.*

"Previous to closing up their cricket bag for the season the Royal Army Medical Corps engaged the Somerset Light Infantry in a friendly game at St. Andrews' on Thursday, August 31, 1911.

"The Somersets defended first, Mr. Steer and Serjeant Buckley facing the Medical bowlers. Mr. Steer was caught and bowled by Burns, a fine low catch 22—1—19. Buckley followed two runs later. Captain Samuda batted carefully for a dozen and Booth made 10 before Major Thurston caught him off Captain Beaman. Lieutenant Watts made top score, and Colonel Everett followed with a dozen. Colour-Serjeant

Mattock only made a couple; Lugg put on eleven, Lieutenant Williams and Private Marney one each. The whole raising 101.

"Major Norrington and Captain Gibson opened for the Medicals; the Major was dismissed first 48—1—23. Captain Gibson remained while four were added 52—2—21. Major Thurston only got a couple, but Captain Beaman made good use of his short stay and knocked up 37 including six boundaries. With the exception of Corporal Hutchings no one else troubled the bowlers—he was 21 *not out*. The Medicals raised 154.

"At a quarter past four the Somersets started again and lost three wickets for 17 runs. Lieutenant Watts made a stay till the end, being bowled for 30 with the last ball of the game; his score included seven *fours*. Captain Samuda was not out 16; the unfinished score was 61 for 4 wickets.

"The Somerset Light Infantry entertained their opponents to luncheon and Serjeant Woodman's catering was greatly appreciated."

SOMERSETS

1st Innings.		*2nd Innings.*	
Lieutenant Steer, c. and b. Burns	19	Lieut. Steer, c. Morrison, b. Beaman	3
Serjt. Buckley, c. Beaman, b. Hutchings	5	Serjeant Buckley, c. Beaman, b. Hutchings	5
Captain Samuda, c. Sayers, b. Thurston	12	Captain Samuda, not out	16
Lance-Corporal Booth, c. Thurston, b. Beaman	10	Lance-Corporal Booth, b. Hutchings	5
Lieut Watts, c. Huntingford, b. Beaman	20	Lieutenant Watts, b. Hutchings	30
Col. Everett, c. Morison, b. Thurston	12	Colonel Everett	Did not bat
Col.-Serjt. Mattock, s. Gibson, b Beaman	2	Colour-Serjeant Mattock	
Pte. Lugg, c. Norrington, b. Thurston	11	Private Lugg	
Lieutenant Owens, s. Gibson, b. Beaman	6	Lieutenant Owens	
Lieutenant Williams, run out	1	,, Williams	
Private Marney, not out	1	Private Marney	
Extras	4	Extras	2
Total	101	Total for 4 wickets	61

ROYAL ARMY MEDICAL CORPS.

Major Norrington, c. Steer, b. Mattock	26
Captain Gibson, b. Samuda	21
Corporal Staff, c. Samuda, b. Mattock	14
Major Thurston, b. Mattock	2
Serjeant-Major Huntingford, b. Samuda	7
Captain Beaman, c. Buckley, b. Samuda	37
Corporal Hutchings, not out	21
Captain Suhr, b. Mattock	9
Private Burns, b. Samuda	4
,, Sayers, b. Marney	9
,, Morrison, run out	0
Extras	7
Total	154

NOTES FROM SIMLA.—Colonel R. S. F. Henderson, K H.P., R.A.M.C., Secretary to the Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated August 24, 1911:—

"*Leave.*—The grant of general leave ex-India, to the undermentioned officers has been concurred in: Captains F. Forrest, R.A.M C., for eight months, from December 1, 1911; F. A. McCammon, R.A.M.C., for one month (in extension).

"*Specialists.*—Captains E. W. Powell and A. H Safford, R.A.M.C., have re-assumed charge of the Brigade laboratories at Aden and Fyzabad respectively.

"*Transfers.*—Captain E. V. Aylen, R.A.M.C., has been transferred from the 1st (Peshawar) to the 2nd (Rawalpindi) Division as Specialist in Dermatology, *vice* Captain D. de C. O'Grady, R.A.M.C., transferred to the 1st (Peshawar) Division in the same capacity.

"Captain F. J. Stuart, R.A.M.C., has been transferred from the 8th (Lucknow) to the 7th (Meerut) Division as Specialist in Dermatology.

"LIST OF TOUR-EXPIRED OFFICERS OF THE ROYAL ARMY MEDICAL CORPS DETAILED TO EMBARK FOR ENGLAND DURING THE TROOPING SEASON, 1911-12.

"1st Transport 'Rewa,' October 12, 1911, from Bombay: Lieutenant Colonel W. C. Beevor, C.M.G, Major T. M. McCulloch, Captain J. W. S. Seccombe. 2nd Transport 'Dongola,' October 26, 1911, from Bombay: Lieutenant-Colonel S. Westcott, C.M.G., Captain C. E. W. S. Fawcett, Captain M. J. Cromie. 3rd Transport 'Plassy' (Cot Ship), November 9, 1911, from Bombay (leaves Aden November 14, 1911): Lieutenant-Colonel J. M. F. Shine, Lieutenant-Colonel R. L. R. MacLeod, Captain E. W. Powell, Captain A. D. O'Carroll. 4th Transport 'Rewa,' December 9, 1911, from Karachi: Lieutenant Colonel A. L. F. Bate, Major A Chopping, Captain M. Keane. 5th Transport 'Dongola,' December 28, 1911, from Bombay: Major J. Hennessy, Captain H. G. Sherren, Captain C. F, White. 6th Transport 'Plassy' (Cot Ship), January 11, 1912, from Bombay: Lieutenant-Colonel W. A. Morris, Captain R. E. Humphrey, Captain W. Benson, Captain W. C. Nimmo. 7th Transport 'Rohilla,' January 31, 1912, from Karachi: Major C. W. Reilly, Captain T. S. Blackwell. 8th Transport 'Rewa,' February 14, 1912, from Karachi: Lieutenant-Colonel B. M. Skinner, M.V.O., Captain T. Scatchard. 9th Transport 'Dongola,' February 23, 1912, from Bombay (leaves Aden February 28, 1912): Major H. N. Dunn, Captain G. G. Tabuteau, Captain G. W. W. Ware. 10th Transport 'Plassy' (Cot Ship), March 13, 1912, from Bombay: Lieutenant-Colonel H. S. McGill, Captain E. G. Anthonisz, Captain A. E. F. Hastings. 11th Transport 'Rohilla,' March 28, 1912, from Karachi: Lieutenant-Colonel E. H. L. Lynden-Bell, Major H. G. Martin, Captain J. S. Dunne."

NOTES FROM THE GOLD COAST.—Mr. J. Hutton (late Warrant Officer, Royal Army Medical Corps, and now Sanitary Inspector, Gold Coast), writes as follows: "Accra, August 4, 1911. As I am sure a short account of the duties and conditions of life of the sanitary inspectors on the Gold Coast will be of interest to you and to readers of the Journal, I venture to send you the following, which refers only to Accra. I understand the conditions are somewhat different in the Western Province.

"When we arrived at Accra, Mr. Wilson and I found we had tumbled into an outbreak of yellow fever, and an orgy of disinfection and demolition of insanitary and congested houses. We had plenty of work for some time, and were glad when night came and Sunday intervened.

"We had just got over the thick of it when another case of fever occurred, and a great deal of the disinfection had to be done again, also further demolition, and now a stranger might think a battery of heavy guns had been playing on the town. However, this sort of thing came to an end at last; Mr. Wilson went to Secondee, and I took over the duties of this place. These consist principally of superintending the native inspectors, visiting their districts, with particular regard to the condition of the water-supply, with a view to checking the breeding of mosquitoes. Accra extends over a very large area, with a large native population, who are for the most part very dirty and insanitary in their habits, so it requires considerable superintendence to keep them up to anything like cleanliness. There are also stations up the country to visit, but the pressure of work in Accra has not yet permitted it.

"The distances one has to travel are too great for walking, so the Government gives me a bicycle allowance.

"The bungalow accommodation is fairly good for officials; should there be no room in quarters the Government supplies a tent and gives an allowance: some of the officials put up at the European factories.

"The weather up to the present has been very fair indeed, the temperature has been moderate; it will, however, probably increase later on; but here we get an almost constant sea breeze, which tempers the heat and makes it fairly cool at night. The atmosphere is rather moist, but I do not think it is as bad as Hong Kong in June, July, and August; certainly anyone having had good health on any foreign service need not fear coming out here so far as the climate is concerned.

"The mosquitoes are a force to be reckoned with, they bite persistently, and if one protects the front and flanks they attack from the rear, and get their point in through the chair seat, if wicker; to obviate that a newspaper comes in very useful.

"Living is expensive, as are servants; a useful plan would be to bring out a good supply of tinned foods, tea, coffee, &c.

"There are absolutely no public amusements, not even a public house, but people do not go without liquor because of that.

"The Government has established a club, with billiard tables and tennis courts.

"The country around is nice and open, and consists of undulating plains slightly wooded. Anyone so inclined may indulge in horse-riding economically.

"Taking it altogether, the Gold Coast is not at all bad for a year's tour, and I can recommend it to any active, healthy man."

LIST OF CASUALTIES.

DISCHARGES.

7561	Serj.-Major	Godman, J. F. C. ..	17.8.11	To pension.
7842	,,	Kay, C. A.	12.9.11	,,
8894	Serjeant ..	Parsons, J. W. ..	5.9.11	Termination of second period.
4671	,, ..	Dent, T. .. .	11.9.11	Medically unfit.
8865	Corporal ..	Smith, A.	14.8 11	Termination of second period.
8870	,, ..	Heald, W.	24 8.11	,, ,, ,,
8885	,, ..	Gibbons, H. ..	2 9.11	,, ,, ,,
12490	,, ..	Kealty, W.	11.9.11	Medically unfit.
9773	Private ..	Vest, W.	15.8.11	At his own request after 18 years.
5531	,, ..	Aitken, G.	16.8.11	Payment of £10.
12509	,, ..	Waring, W. J. ..	18.8.11	Termination of first period.
14622	,, ..	Mansfield, F ..	14.8 11	,, ,, ,,
12511	,, ..	Smith, E.	20.8.11	,, ,, ,,
5512	,, ..	Shearsby, J. H. ..	21.8.11	Payment of £10.
5688	,, ..	Shields, T.	28.8.11	,, ,,
5681	,, ..	Lowery, W... ..	6.9 11	,, ,,
8898	,, ..	Day, T.	9.9.11	Termination of second period.

TRANSFERS TO ARMY RESERVE.

16996	Pte.	McBryer, J. C...	7.8.11	19215	Pte	Leonard, P. ..	29 8 11
18961	,,	Thomas, H. J...	16.8.11	1913	,,	Johnys, W. C. ..	28.8 11
1875	,,	Kitchen, J. E	18 8.11	1928	,,	Orr, A.	30 8.11
1881	,,	Walker, J. W. ..	20.8.11	1927	,,	Hutchins, W. ..	30 8.11
1879	,,	Harris, T. ..	20.8.11	19217	,,	Banks, R. B. ..	30.8.11
1877	,,	Curry, R. C. ..	20.8 11	1926	,,	Clements, H ..	30.8.11
1880	,,	Seitz, C. R. ..	20 8.11	1940	,,	Turner, J E. ..	1.9.11
1883	,,	Bancroft, A. ..	21.8.11	19214	,,	Parker, H. ..	29.8.11
1882	,,	Aitken, A. L. ..	21.8.11	19251	,,	Murphy, I. J. ..	31 8.11
1885	,,	Marshall, E. D	21.8 11	1941	,,	Bottley, G. ..	4.9.11
1896	,,	Dow, V... ..	23.8.11	19229	,,	Sullivan, J ..	4.9 11
1897	,,	Harvey, A. E. ..	23.8.11	1953	,,	Marchant, H. ..	6.9 11
1918	,,	Brunton, G. E...	24.8.11	1976	,,	Jones, A. W. ..	8.9.11
1916	,,	Dolman, J. ..	24.8.11	1942	,,	Lee, A. A. ..	4.9.11
18937	,,	Shaw, T. ..	25.8 11	160	,,	Pettit, V. ..	6.9 11
1890	,,	Woods, H ..	24.8 11	1955	,,	West, W. J ..	6.9.11
1900	,,	Day. A. W. ..	25.8.11	1947	,,	Anderson, R. ..	7.9.11
19203	,,	Ford, J	23.8.11	1964	,,	Shipton, H. G...	9.9.11
1901	,,	Kirk, J.	25.8.11	1944	,,	Burbidge, E. R.	6.9.11
1895	,,	Bulleid, S. ..	25.8.11	1983	,,	Shale, H. ..	8.9.11
19201	,,	Kell, T.	22.8.11	1957	,,	Jackson, W. H.	9.9.11
19204	,,	Kell, G... ..	24.8 11	1961	,,	Robinson, J. ..	8.9.11
1899	,,	Slawson, W. H.	24.8.11	1958	,,	Berrie, W. ..	7.9.11
1891	,,	Rance, H. J. ..	25.8 11	1982	,,	Walsh, J. J. ..	7 9.11
1908	,,	Emmett, A. ..	27.8.11	1977	,,	Lindsay, G. W. A.	8.9.11
1924	,,	Simmons, A. ..	30.8.11	2001	,,	Simpson, C. C. T.	9.9.11
1933	,,	Radford, T. C. ..	31.8.11	1979	,,	Strudwick, W. J.	9 9.11
1929	,,	Robbins, E ..	30.8.11	1996	,,	Bulmore, L. E.	16.9.11
1925	,,	Marchant, W. ..	30 8 11	1981	,,	Pavier, G. ..	11.9.11
1932	,,	Neville, W. E. ..	31.8.11	19248	,,	Hunt, J. R. ..	15.9.11
1909	,,	Fowell, J. J. ..	27.8.11	2004	,,	Elliott, R. E. ..	16.9.11
1912	,,	Higginson, W. ..	28.8.11				

TRANSFERS FROM OTHER CORPS.

5665	Private	McNair, G...	19.7.11	From A. S. Corps.
5698	,,	Brownlie, J.	1.8.11	,, 6th Dragoon Guards.

TRANSFERS TO OTHER CORPS.

10203	Serjeant	Webberley, E. J.	9.8.11	To 2nd H.C.F.A. Canterbury.
4868	Private	Warrington, A.	15.8.11	,, A.O. Corps.
5536	,,	Mackrell, G. J.	4.9.11	,, A.S. Corps.

APPOINTED BUGLER.

2289	Boy	Harris, H. P.	23.8.11	

DEATHS.

4526	Private	Cox, L.	6.9.11	At Hounslow.
5129	,,	Nichols, C. E.	5.9.11	,, Aldershot.

EMBARKATIONS FOR ABROAD.

To N. China, per s.s. "Somali," September 8, 1911.

18850	Serjeant	Eagles, G. W.	1884	Private	Gaughan, E. S.
1772	Private	Butler, W.	19823	,,	Kilyon, T. J.
4572	,,	Dixon, T.	1424	,,	Ryan, J.

DISEMBARKATIONS FROM ABROAD.

From Jamaica, per s.s. "Atrata," August 21, 1911.

9953	S.-Serjt.	Lovegrove, E. J.			

THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

For Quartermaster-Serjeant.

14705	S.-Serjt	Muirhead, W. A.	10953	S.-Serjt.	Way, W. H.
12023	,,	Morris, S. C.	16287	,,	Saunders, W. E.

For Staff-Serjeant.

18948	Serjeant	Moore, E.	11027	Serjeant	Masters, J. H.
12056	,,	Winton, E.	11116	,,	Thomas, G. E.
14538	,,	Wells, H	11089	,,	Flint, F. S.

For Serjeant.

14356	Lce.-Serj.	Vyse, W. L.	11712	Corporal	Kilyon, J.
18902	Corporal	Blundell, W.	17964	,,	Bowler, W.

For Corporal.

501	Private	Benson, O.	1869	Private	Brason, R.
2027	,,	Coney, E. H.	19570	,,	Fisher, W.
17839	,,	Watkins, A.	94	,,	Price, D. W.
133	,,	Waggitt, H.	218	,,	Dale, L. A.
986	,,	Godfrey, A. E.	1808	,,	McClay, W. J.
4384	,,	Turner, S, G.	19175	,,	Stow, F. E.

PROMOTIONS.

SERJEANTS-MAJOR.

10162	Qmr.-Serjt.	Drury, C.	29.7.11	*Vice* W. Carey, dis. med. unfit.
9053	,,	Filmer, F. J. ..	5.8.11	,, H. J. Dudman to pension.
10015	,,	Grant A. W. ..	18.8.11	,, J. F. E Godman to pension.
8991	,,	Cox, R.	13.9.11	,, C. K. Kay to pension.

QUARTERMASTER-SERJEANTS.

10206	S.-Serjt. ..	Enwright, J. ..	19.7.11	*Vice* C. J. Strong promoted.
11051	,, ..	Williams, H.	26.7 11	,, W. H. Akehurst to pension.
12960	,, ..	Willsher, J. W.	29.7.11	,, C. Drury promoted.

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Lieutenants are confirmed in their rank . James O. Hamilton, M.B., Arthur H. Habgood, Alexander C. Court, M B., Clarence E. Greeson, M.B., John P Charnock, M.B., William Crymble, Laurence M. Routh, Sydney J. Higgins, Robert H. Nolan, M.B., Leonard W. O. Taylor, M.B., Reginald Fisher, John H. C. Grene, M.B., Harold F. Vellacott.

The undermentioned to be Lieutenants (on probation). Cadet Lance-Corporal Charles Hope Carlton, from the University of Oxford Contingent, Officers' Training Corps, dated July 31, 1911 ; Cadet Corporal D'Arcy Power from the University of London Contingent, Officers' Training Corps, dated August 7, 1911.

Lieutenant Alexander C. McKillop, M.B., resigns his commission, dated September 6, 1911.

TERRITORIAL FORCE.

YEOMANRY.

Nottinghamshire (South Nottinghamshire Hussars) Yeomanry: Surgeon-Lieutenant William T. Rowe, M.D., to be Surgeon-Captain, dated July 27, 1911.

ROYAL ARMY MEDICAL CORPS.

2nd Northumbrian Field Ambulance, Royal Army Medical Corps.—The undermentioned officers to be Captains: Lieutenant Douglas V. Haig, M D., dated July 30, 1911 ; Lieutenant David L. Fisher, M.B., dated July 31, 1911 ; Lieutenant George G. Farquhar, M.B., F.R.C.S.Eng., dated August 1, 1911.

1st Northern General Hospital, Royal Army Medical Corps.—Captain William E. M. Ede, M.D., resigns his commission, dated August 19, 1911.

Officers (Attached to other Units).

Lieutenant Charles J. I. Krumbholz, M.B., to be Captain, dated April 21, 1911 ; Robert Donald to be appointed Lieutenant, dated July 28, 1911 ; Captain George Wilson, M.B., to be Major, dated May 1, 1911 ; Captain Albert Hilton, to be Major, dated July 12, 1911 ; Stanley Leemore Brimblecombe to be Lieutenant, dated May 11, 1911.

Lieutenant Percy Moxey from the 3rd South Midland Field Ambulance, Royal Army Medical Corps. to be Lieutenant, dated August 21, 1911; Lieutenant John Leach, M B., to be Captain, dated May 18, 1911 ; Major William C. Beatley, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated, September 9, 1911.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Sisters: Miss H, L. A. Jack to Harrismith from Pretoria; Miss M. C. Johnson, to Pietermaritzburg, from Bloemfontein; Miss M. F. Steele, to Tidworth, from London; Miss M. A. Cachemaille, to Alexandria, Egypt, from Cairo. Staff Nurses · Miss J S. G. Gardner, to Pietermaritzburg, from Potchefstroom ; Miss C. V. S. Johnson, to Harrismith, from Pretoria ; Miss G. E. Vernon, to Aldershot, on appointment; Miss E. M. Long, to Devonport, on appointment; Miss M. E. Stewart, to Aldershot, from Netley ; Miss B. M. Nye, to Cairo, on arrival in Egypt ; Miss S. M. Wooler, to Cairo, on arrival in Egypt ; Miss A. A. Steer, to Colchester, from Egypt.

UNITED SERVICE MEDICAL SOCIETY.

The next meeting of the above Society will be held at the Royal Army Medical College on October 11, 1911, at 5 p.m

Business—

(1) President's Address.

(2) Major E. M. Pilcher, D.S.O., R.A.M.C., "The New Bullet."

EXAMINATION PAPERS.

The following selected questions are published for general information.—

QUARTERMASTER-SERJEANTS.

Para. 285, b. 1.

(1) Enumerate the personnel of a tent sub-division Infantry Field Ambulance. (One section).

(2) Write down the Medical and Surgical Equipment of a Section Cavalry Field Ambulance.

(3) Describe a Hospital Marquee and give a diagram showing the ground plan of pegs necessary to erect such a Marquee.

(4) What is the personnel of an Advanced Depot of Medical Stores? What Units would draw their supplies from the Advanced Depot?

(5) What are the duties of the bearers and Royal Army Medical Corps Privates in a Field Ambulance?

(6) You are in command of a party of 97 rank and file, state how, if attacked by savages you would form your party into a hollow square to resist attack.

(7) Given a squad marching in Fours. What test is there to decide if the marching is good? Give the detail for Form Fours.

(8) How should a Company, Royal Army Medical Corps, be drawn up for inspection by, say the General Officer Commanding?

Para. 285, b. 2.

(1) Describe the routine method of keeping the hospital diet account.

(2) How are the patients and personnel of a Field Ambulance rationed?

(3) What are the duties of a Non-Commissioned Officer acting as Quartermaster-Serjeant in a Field Ambulance?

(4) What articles of clothing and necessaries are left at the base by each man proceeding to the front?

(5) State what measures you would adopt to transport sick and wounded from the field, should Ambulance wagons not be available.

(6) What Army Forms are used in connection with Diets and Extras and by whom are they prepared?

(7) A Medical Officer in charge of a ward orders a patient some fish. Trace the source of this fish until it is finally eaten by the patient, stating all the necessary entries and by whom, and naming all the people who will be responsible for it until it is handed as a food to the patient.

(8) Enumerate the most important duties of a Warrant Officer in a Field Ambulance.

Para. 285, b. 3.

(1) Describe the Army Forms used in connection with issues of Clothing and Necessaries to Special Reservists assembled for annual training with special reference to the mode of making entries in the Clothing Account, when and to whom it is rendered and the documents that accompany it.

(2) How is the soldiers' clothing maintained, and how is the amount provided for that purpose expended and accounted for?

(3) How many pairs of Field Medical Panniers are in the possession of the following Units?

Field Ambulance, Clearing Hospital, Stationary Hospital, Ambulance Train, General Hospital.

(4) If sufficient articles of equipment and clothing are not held on charge for Reservists joining on mobilization from what Departments would they be obtained.

(5) In what manner would the personal clothing in the following instances be dealt with:—

(i) Invalids on discharge. (ii) Recruits discharged within three months of enlistment. (iii) Soldiers relegated to the reserve for an offence on enlistment or discharged for misconduct.

(6) What is the duty of a Board of Survey or Stocktaking Board in connection with a Quartermaster's Clothing Store?

(7) How are articles of equipment in a soldier's possession adjusted if lost, or damaged beyond repair?

(8) How is the value recovered for Stores or Ammunition issued from Ordnance Stores on repayment?

Para. 285, b. 4.

(1) How do Field Ambulances and Regimental Units replenish their Medical Panniers?

(2) What precautions will be taken when despatching stores scheduled as "dangerous"?

(3) What are the best methods of preserving:—

(*a*) Surgical Instruments (steel).

(*b*) Rubber goods, in a tropical climate.

(4) Describe how the duties in a General Medical Store are conducted regarding the receipts and issues and stocktaking boards.

(5) Describe the routine for the disposal of Medicine accounts in a General Medical Stores as contained in the Regulations for Army Medical Service,

(6) Mention the procedure contained in the Regulations Army Medical Service for the unpacking of consignments of medical supplies received. First at home Second abroad.

(7) When instruments or surgical appliances are found unserviceable or deficient describe the procedure of dealing with such.

(8) What are the Regulations governing the supply of artificial teeth.

STAFF-SERJEANTS.

Para. 284, b, 1.

(1) What documentary procedure is carried out when it is proposed to discharge a recruit under three months' service as medically unfit?

(2) What qualifications must a soldier possess in order to transfer to the Royal Army Medical Corps?

(3) What becomes of the original attestation duplicate attestation, and conduct sheets of a soldier in the following cases·

(*a*) Death

(*b*) Discharges.

(*c*) Promotion to Warrant Rank.

(*d*) Promotion to Commissioned Rank.

(4) Whose sanction has to be obtained before a soldier can be employed under a Colonial Government. During his employment what will be his position with regard to his Corps. To what rank will he be eligible for regimental promotion. In the event of his rejoining his Corps in what rank will he be absorbed?

(5) On promotion to Colour-Serjeant or higher rank how is the Company conduct sheet disposed of.

Para 284, b. 2.

(1) Enumerate the various rates of "additional pay" which can be granted in the Royal Army Medical Corps, and state how the charges for additional pay are supported.

(2) What gratuity is paid to a man on transfer to the Reserve or Discharge. In what cases is this not paid?

(3) What are the Regulations with regard to forfeiture of a soldier's medals, gratuities and annuities?

(4) A man is absent without leave from 9.30 p.m on Saturday night till 12 50 a.m. on Sunday morning. This necessitated warning another man for his duty. How much money does he lose if he has four years' service and is drawing the third rate of Corps pay? How much would he lose if he were absent till "lights out" on Tuesday night?

(5) How is the weekly pay of a detachment away from headquarters obtained? What form is used?

SERJEANTS.

Para. 283, b. 1.

(1) Give the detail for forming fours, when a Company is (*a*) advancing, (*b*) retiring, (*c*) marching in file to the right flank, (*d*) left flank.

(2) A Company is marching in Company Column and the caution "Change direction left" is given. Give detail.

(3) Give the position of the Company Commander, (2) the Subalterns, (3) the Section Commanders, when the Company is in line.

(4) If a squad be ordered to halt or mark time when a part of the fours only have wheeled, how will the remainder proceed?

Para. 283, b. 2.

(1) What important point should be impressed on every man in acting as No. 4 of the stretcher squad.

(2) Eight stretcher squads are advancing and receive the order "From the right to four paces extend." How is this movement effected?

(3) In ambulance wagon drill give the detail for lower stretchers and fix slings.

(4) Give the word of command and detail for supplying a number of stretcher squads (formed up and told off) with stretchers.

Para. 283, b. 3.

(1) What are the orders to soldiers with regard to publishing military information?

(2) What are the regulations relative to Warrant Officers, N.C.Os and men, taking part in meetings, processions, &c.

(3) How would the following salute:—

(*a*) Warrant Officers and N C.Os wearing swords?

(*b*) A soldier in uniform riding a bicycle?

(*c*) A soldier carrying something in both hands?

(4) What are the regulations with regard to punishment drill? How are these modified in the case of the Royal Army Medical Corps?

Para 283, b. 4.

(1) When a soldier reports sick, what is the procedure until he arrives at the hospital?

(2) On the outbreak of epidemic disease in barracks, what precautions are taken regarding articles likely to convey infection?

(3) What are the orders regarding the removal of clothing or equipment by N.C.Os and men on guard?

(4) What are the duties of the N.C.O. of an escort sent to take over a deserter?

Para. 283, b. 5.

(1) Describe the destructor in use at this hospital and describe how you would make an improvised one in camp.

(2) In a standing camp what is the average allowance of water for all purposes for a man and for a horse? How much should be allowed daily for each man for drinking and cooking purposes?

(3) What is the best method of disposing of "kitchen water," *i.e.*, the washings of pots, &c, in a standing camp.

(4) You are N.C.O. of an advance party into camp. What would you do previous to the arrival of your unit on the ground.

Para. 283, b. 6.

(1) Give a brief summary of the daily routine of clerical duties of the senior N.C.O. of a small hospital.

(2) Write down the extracts from the Lunacy Acts contained in the Standing Orders for the Royal Army Medical Corps with regard to—

(*a*) Ill-treatment of mental cases.

(*b*) Escape of mental cases.

(3) What qualifications must a N.C.O. possess before his name can be registered at the Record Office for employment as a clerk?

(4) What is the regulation laid down for the transfer of a General Duty Private to the Nursing Section?

CORPORALS.

Para. 280, e. 1.

(1) What are the duties of the N.C.O. in charge of an escort for a deserter?

(2) Is a soldier bound to obey an order given by a superior officer belonging to another Corps?

(3) What is meant by the term "an act of simple drunkenness"?

Para. 280, c. 2.

(1) What are the duties of the N.C.O. in charge of the Company Messing Book?

(2) What are the duties of the N.C.O. in charge of the Pioneers?

(3) What are the duties of a Commander of a Guard in relation to:—
- (*a*) Visiting sentries.
- (*b*) Guard reports.
- (*c*) Stores.
- (*d*) Orders.

Para. 280, c. 3

(1) You are attached to a small musketry camp of about a hundred men. What sanitary precautions would you take to preserve the health of the men?

(2) Describe the procedure of an escort passing through London.

(3) Describe the dangers from a sanitary point of view which may infect a field kitchen.

Para. 280, c. 4.

(1) A hospital patient wishes to procure tobacco. How may this be done?

(2) After the diet sheets are marked up by the officers, give the procedure to be followed later to account for the diets and extras

(3) When will a wardmaster go round the wards, and to what points will he pay particular attention?

Para. 280, c. 5.

(1) Give your reasons why a stretcher (with patient) should not be carried on the shoulder.

(2) How would you carry a helpless patient off the field single handed?

(3) Describe three improvised stretchers.

Para. 280, c. 6.

(1) How would you treat a consumptive case who commenced to cough up blood?

(2) What treatment would you adopt in a case of a child severely scalded on the body and limbs?

(3) How would you proceed to act if you saw a man in contact with an electric cable who was unable to extricate himself?

Para. 280, c. 7.

(1) What is the normal composition of air? How is it that in wards not well ventilated the air becomes "stuffy"?

(2) What is the usual temperature of a sick ward? What temperature of the ward would you keep for the following cases:—
- (*a*) Acute pneumonia.
- (*b*) Case of sprained knee.
- (*c*) Enteric fever.

(3) In what part of the room would you expect to find foul air, and why?

Para. 280, c. 8.

(1) In the "Medical Companion" enumerate —
- (*a*) The instruments
- (*b*) The antiseptics and the antiseptic dressings.

(2) What instruments would you prepare for a radical cure for hernia? Describe in full the method of sterilization of these instruments.

(3) Describe the difference between the following instruments
- (*a*) Bistoury and scalpel.
- (*b*) Sound and catheter.
- (*c*) Ophthalmoscope and laryngoscope.

BIRTH.

NIMMO.—At Chakrata, United Provinces, India, on August 7, 1911, the wife of Captain Wilfrid C. Nimmo, R.A.M.C., of a daughter.

OBITUARY.

It is with deep regret we have to record the untimely death of Lieutenant D. E. C. Pottinger, R.A.M.C., who passed away at the Station Hospital, Bareilly, after a brief illness, on August 2, 1911. The sad announcement of his death came as a great shock to everyone, not alone in India but at home, where he was well known, particularly at his "Alma Mater," Edinburgh.

After a distinguished career in Edinburgh University, he graduated in 1905, and for two years before entering the Service he was engaged in private practice, after which he entered the Royal Army Medical Corps in 1908. After serving a couple of years in the Scottish Command he was posted to India, where his family for many generations have served with distinction.

His funeral took place with full military honours on August 3; the guncarriage was furnished by the 73rd Battery, Royal Field Artillery. The subalterns of the 4th Worcestershire Regiment, 16th Rajputs and 17th Bengal Lancers were pall bearers. The firing party was furnished by the 4th Worcestershire Regiment, of whom he was in medical charge.

The bands of the 4th Worcestershire Regiment and 16th Rajputs played appropriate music during the progress of the procession from the hospital to the cemetery.

Wreaths were sent by the Officers, Royal Army Medical Corps, 16th Rajputs, 17th Cavalry, 4th Worcestershire, Captain and Mrs. W. Davis, R.A.M.C., Captain and Mrs. J. Johnstone, I S.M.D., the assistant surgeons of the hospital, Mr. and Mrs. Weir, and the Outram Institute.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

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50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Colonel Sir David Bruce, Colonel J. M. Beamish, Major R. A. Cunningham, Colonel J. P. Woodhouse, Captain P. S. Lelean, Major H. V. Prynne, Major David M. Greig, Colonel R. S. F. Henderson, G. O. C. Redmond, Lieutenant G. J. Keane, Major M. H. Babington, Lieutenant-Colonel C. Birt, Major G. N. Biggs, Lieutenant and Quartermaster C. W. Kinsella, Lieutenant-Colonel E. M. Wilson.

The following publications have been received:—

British: The Indian Medical Gazette, The Commonwealth Military Journal, The Public Health Journal (*Canada*), *Journal of Royal United Service Institution, Guy's Hospital Gazette, Sleeping Sickness Bureau, The Hospital, The Army Service Corps Journal, The Lancet, Army and Navy Gazette, Transactions of the Society of Tropical Medicine and Hygiene, The Australasian Medical Gazette, Medical Press and Circular, The Royal Sanitary Institute, The Royal Engineers' Journal, Annals of Tropical Medicine and Parasitology, St. Bartholomew's Hospital Journal, The Practitioner, The Journal of Meat and Milk Hygiene, Public Health* (England), *The Military Surgeon, The Medical Review, Red Cross and Ambulance News, The Journal of Tropical Veterinary Science* (Quarterly), *The Journal of Tropical Medicine and Hygiene, The Indian Medical Journal.*

Foreign. Bulletin of the Johns Hopkins Hospital, Revista di Sanidad Militar, Archiv für Schiffs- und Tropen-Hygiene, Deutsche Militärärztliche Zeitschrift, Le Caducée, Office International D'Hygiene Publique, Bulletin de l'Institut Pasteur, Japanese Medical Journal, Malaria e Malattie Dei Paesi Caldi, Archives de Medecine et Pharmacie Navales, Norsk Tidsskrift for Militærmedicin, American Medicine.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, **six** months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year, but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"
WAR OFFICE, WHITEHALL, S.W.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

NOVEMBER, 1911.

EXTRACTS FROM THE LONDON GAZETTE.

CAVALRY.

1ST LIFE GUARDS.

Surgeon-Lieutenant-Colonel Benjamin W. C. Deeble retires on retired pay, dated September 27, 1911. Surgeon-Lieutenant-Colonel Deeble entered the service as a Surgeon, Army Medical Department, on February 3, 1883, became Surgeon-Major, Army Medical Staff, February 3, 1895, Surgeon-Major, 1st Life Guards, July 23, 1902, and Surgeon-Lieutenant-Colonel, 1st Life Guards, February 3, 1903. His war service is: South African War, 1899-1900. Operations in Natal, 1899, including action at Lombard's Kop Defence of Ladysmith Queen's medal with two clasps.

Surgeon-Captain Robert M. Cowie, from the 2nd Life Guards, to be Surgeon-Major, dated September 27, 1911.

2ND LIFE GUARDS.

Captain Evelyn John Hansler Luxmoore, from the Royal Army Medical Corps, to be Surgeon-Captain, dated September 27, 1911.

ARMY MEDICAL SERVICE.

Colonel Alfred Peterkin, M.B., is placed on retired pay, dated October 2, 1911. Colonel Peterkin entered the service as a Surgeon, Army Medical Department, on July 31, 1880; became Surgeon-Major, Army Medical Staff, July 31, 1892; Lieutenant-Colonel, Royal Army Medical Corps, July 31, 1900; Lieutenant-Colonel with increased pay October 14, 1903, and Colonel, April 11, 1908. His war service is: South African War, 1881: Transvaal Campaign. South African War, 1902. Operations in the Transvaal, April and May, 1902. Operations in the Orange River Colony and Cape Colony, April, 1902. Queen's medal with four clasps.

Lieutenant-Colonel Herbert J. Barratt, from the Royal Army Medical Corps, to be Colonel, *vice* A. Peterkin, dated October 2, 1911.

ROYAL ARMY MEDICAL CORPS.

Major Herbert I. Pocock to be Lieutenant-Colonel, *vice* H. J. Barratt, promoted, dated October 2, 1911.

Major Edgar McK. Williams retires on retired pay, dated October 4, 1911. Major Williams entered the service as a Surgeon, Medical Staff, on January 31, 1891, and became Major, Royal Army Medical Corps, on January 31, 1903. His war service is: Operations in Chitral, 1895, with the Relief Force. Medal with clasp.

Major Arthur O. B. Wroughton, from the half-pay list, is restored to the establishment, September 20, 1911.

The undermentioned Captains to be Majors, dated August 17, 1911: Francis S. Irvine, M.B., Frank G. Richards, Ernest B. Knox, M.D., John Matthews, Patrick

S. O'Reilly. Dated September 4, 1911: Arthur M. MacLaughlin, M.B., James A. Hartigan, M.B., James F. Martin, M.B., Edmund McDonnell, M.B., Arthur H. Safford.

Captain Frank H. Noke retires on retired pay, dated September 20, 1911. Captain Noke entered the service on January 30, 1904, and became Captain on July 30, 1907.

HIGHER RATE OF PAY.—Lieutenant-Colonel W. A. Morris, has been selected for the higher rate of pay under Article 317, Royal Warrant.

ARRIVALS HOME FOR DUTY.—*From Gibraltar* On October 9, Major E. W. P. V. Marriott, Captain J. H Graham. *From Cyprus* On October 9, Captain G. E. Ferguson

ARRIVALS HOME ON LEAVE.—Lieutenant-Colonel W. W. Pike, D.S.O.: Majors J. G. McNaught, H. S. Thurston and E. T. Inkson, V.C.; Captains D. S. B. Thomson and R. P. Lewis.

POSTINGS.—Major E. W. P. V. Marriott, Captain J. H. Graham, Captain A. D Fraser, to the Irish Command. Major A. O. B. Wroughton to the Eastern Command. Major E. M. Morphew to the Western Command. Major T. H. J. C. Goodwin, D.S O., Captain G. E. Ferguson, to the Southern Command.

TRANSFERS.—Lieutenant-Colonel W. Turner, from Northern Command to Aldershot. Lieutenant-Colonel N. C. Ferguson, C.M.G., from London District to the Northern Command.

TRANSFERS TO THE HOME ESTABLISHMENT. –From India On November 8, Major E. M. Morphew; on October 25, Major T. H. J. C. Goodwin, D.S.O., on October 20, Major D. Harvey.

APPOINTMENTS. --Lieutenant-Colonel J. M. Irwin, Principal Medical Officer, South China. Lieutenant-Colonel W Turner, Charge of the Connaught Hospital, Aldershot. Lieutenant-Colonel N C. Ferguson, C.M G., Charge of the Military Hospital, York. Captain P. G. Patch, Specialist in Otology, Rhinology, and Laryngology, Northern Command.

RETIRED PAY APPOINTMENTS.— Lieutenant-Colonel H. W. Austin, Medical Charge Fort Stamford.

QUALIFICATIONS.—Captain D. O Hyde has obtained the Diploma in Public Health of Trinity College, Dublin.

ROSTER FOR SERVICE ABROAD. An exchange of destinations in India has been approved between Majors W. T. Mould and L P. More. Lieutenants C. T. V. Benson and R C. Priest have been permitted to exchange dates of embarkation for India.

EMBARKATIONS. -*For West Africa* -On September 21, Major J. W. Leake.

For India On September 27, Colonel F H Treherne, Major F. J. C. Heffernan; Captain A. D. Jameson and Lieutenant A. S M Winder On October 11, Lieutenant-Colonel J. Fallon, Captain J. H. Robinson and Lieutenant M. White

For Egypt On October 4, Lieutenant-Colonel R Kirkpatrick, C M.G.

For Ceylon.—On October 4, Lieutenant-Colonel M L. Hearn; Major E. P. Sewell; Captain P. G. Hyde.

For Singapore.--On October 4, Lieutenant-Colonel J. J. C. Donnet; Captain A. J. Williamson.

For Hong Kong. -- On October 4, Lieutenant-Colonel F. W. G. Gordon-Hall; Captains A. McMunn and A. E. B. Wood.

ARBOR HILL HOSPITAL.

His Majesty the King has been graciously pleased to approve of the new hospital at Arbor Hill, Dublin, being styled "King George V. Hospital."

DISTRIBUTION OF OFFICERS TO COMMANDS IN INDIA.

Officers of the Royal Army Medical Corps proceeding to India during the trooping season 1911-12 have been allotted to divisions in India as under :—

Northern Army. –2nd (Rawal Pindi) Division Major A. A. Seeds, Captain F. A. Stephens, Lieutenant W. H. O'Riordan. 3rd (Lahore) Division: Lieutenant-Colonel J. Fallon, Major L. Way, Major R. H. Lloyd, Major E. P. Connolly, Captain F. W. W. Dawson. Lieutenant F. W. M. Cunningham. 7th (Meerut) Division: Major

J. Cowan, Major W. A. Woodside, Captain E. Bennett, Captain A. D. Jameson, Captain J. S. Bostock, Captain H. T. Stack, Lieutenant P. S. Tomlinson. 8th (Lucknow) Division: Lieutenant-Colonel R. W. Wright, Major W. T. Mould, Captain J. H. Robinson, Captain J. H. Duguid, Lieutenant S. S. Dykes, Lieutenant R. C. Paris, Lieutenant M. White, Lieutenant A. S. M. Winder.

Southern Army.—4th (Quetta) Division: Major C. F. Wanbill, Major J. M. Sloan, D.S.O. 5th (Mhow) Division: Major F. J. C. Heffernan, Captain P. C. Douglass, Captain A. W. Sampey, Lieutenant R. C. Priest. 6th (Poona) Division: Lieutenant-Colonel C. C Reilly. 9th (Secunderabad) Division: Lieutenant-Colonel C. A. Lane, Major F. J. W. Porter, D.S.O., Captain J. L. Jones, Captain H. A. Bransbury. Burma Division: Major L. Wood, Lieutenant C. T. V. Benson, Lieutenant C. J. R. Yourell.

NOTES FROM ALDERSHOT —Serjeant-Major Roberts, writes: "Considerable interest is being shown this season in the welfare of the Corps Football Team. Their record to date is very gratifying, as will be seen from the following results in connection with the Senior Military League:—

1st Hants Regiment	5	goals for	1	against.
1st Leicester Regiment	2	,, ,,	0	,,
2nd Royal Inniskilling Fusiliers	3	,, ,,	0	,,
4th Royal Fusiliers	1	,, ,,	0	,,
1st King's Royal Rifle Corps	0	,, ,,	2	,,

"The team has undergone many changes during the past two years; of the stalwarts existing then only Corporal Miller remains and he is as good as ever, a really splendid centre half, indefatigable and ubiquitous, an example to the younger members. Two young backs, in Southall and Desperques were 'discovered' just in time; how well they work will be seen from the 'goals against.' They are fairly inoculated with the 'Miller' enthusiasm.

"The attendance at each game has increased, for nothing succeeds like success.

"In addition to the Seniors a Junior team is this year in being, its members being undefeated to date. They have a keen eye to the Championship of their division.

"The Corps Recreation Ground is now a very fine enclosure, it has been enlarged to provide ample playing space for two games at a time.

"For years past there has existed a 'Depot Rifle Club,' which has now been incorporated with the other companies here and will in future be known as 'The Royal Army Medical Corps Rifle Club, Aldershot Command.'

"The bringing into life of the new organization is due to the initiative of Captain Cotterill, R.A.M C., who is a very keen shot.

"The following is the result of a Serjeants' Mess Rifle Competition held on Ash Ranges on Saturday afternoon, Sept. 30th.

		Seven rounds independent firing at 500 yards	Seven rounds rapid firing in 30 seconds at 100 yards	Points received	Total
1st Prize,	Staff-Serjeant Maxwell	21	23	Scratch	44
2nd ,,	Serjeant Sprule	12	24	6	42
3rd ,,	Serjeant-Major Figg	17	18	6	41
4th ,,	Serjeant Avery	14	24	3	41
5th ,,	Staff-Serjeant Squire	10	18	6	34
6th ,,	,, Merchant	18	15	Scratch	33
7th ,,	Serjeant-Major Bollen	8	17	6	31

"Seven prizes The wind at the longer range was very strong, at times almost blowing a gale and required a lot of handling; No. 3 range being the most exposed of all the ranges at Ash.

"Leaving sport for awhile, many readers will doubtless be interested to hear that the 'Medical Exercises for 1912' are to take place in the Aldershot Command This will entail the Mobilization of three Field Ambulances and one Clearing Hospital, at war strength; no doubt members of the Corps from other places will make further acquaintance with this command.

"Serjeant-Major R. Cox recently promoted to Warrant Rank has proceeded to Grosvenor Road for duty. He has been relieved at the Training School, where he has been employed for the past three years by Staff-Serjeant R. Watt."

NOTES FROM GIBRALTAR.—Lieutenant-Colonel S. G. Allen writes: "Gibraltar has begun to fill up once again. The advent of October always marks the return of those who have been fortunate enough to obtain leave or furlough home for the hot months. Ladies also, as is their wont at this season, are flitting back in numbers to face the duties and gaieties of what, owing to the Royal visit, is expected to be an exceptionally brilliant season.

"For those who have been unable or undesirous of getting leave (with a view to accumulating a big credit balance for next year), the summer has not been too bad, the exceptional heat wave experienced in England not having reached us here.

"Unfortunately, a rather sharp outbreak of enteric fever (now we trust at an end) among the garrison and civil population has marred an otherwise good season.

"There have been several changes here lately in the ranks of the Royal Army Medical Corps. Captain Graham has left us on expiration of his tour, as has also Major Marriott. The former was our most successful bat last season; his presence will be much missed on the cricket field, as he was a tower of strength to the Royal Army Medical Corps Eleven, and he also played for the Garrison. Major Marriott during his five years' residence won many triumphs at our race meetings. His racing career here closed in a blaze of glory, his English mare, "Miss Gibbs," having carried off the Gold Cup, presented by His Majesty The King of Spain, at the Coronation Meeting in June. Before his departure Major Marriott was entertained by Colonel H. H. Johnston, C.B., Principal Medical Officer, and the Officers, Royal Army Medical Corps, at a farewell dinner at the Mediterranean Club. Captain Priestley, R.A.M.C., whose tour is also drawing to a close, was also our guest on this occasion Captain Graham having already left, we were unable to offer him the same compliment.

"We have also to regret the departure, after three years' service here, of Quartermaster-Serjeant Grant, R.A.M.C., who on promotion to Warrant Rank has been transferred to Home Establishment.

"Lieutenants Roche and Wright have recently joined us to complete establishment.

"The following table shows the best batting averages for the season and the matches played with results.

Matches played—21. *Won*—10. *Drawn*—2. *Lost*—9.

Name	No. of innings	Most runs scored in an innings	Times not out	Average
Captain Graham	10	75	2	43·4
Corporal Court	14	65	3	22·4
Private Coles	21	55	0	20·9
,, Wilkinson	47	41	0	16·6

NOTES FROM MALTA.—Serjeant-Major Collard, writes: "On September 14, the Matron, Miss J. Hoadley, R.R.C., Q.A.I.M.N.S., invited the successful candidates for A.F.C. 344 to tea. Serjeant-Major Collard returned thanks to the Matron for the entertainment and the considerable help afforded the candidates during training, and the untiring energy displayed by herself and officers. Serjeant Gibson supported and warmly thanked the Matron.

"The Matron made a suitable response. Lieutenant-Colonel A. F. Russell, C.M.G., who had looked in during the meal, congratulated the candidates on their splendid results.

"FAREWELL SMOKING CONCERT.

"The Serjeants and Corporals, Royal Army Medical Corps, mustered strong on Tuesday night, September 26, at the Serjeants' Mess, adjoining the Military Hospital, Zabbar, the occasion being a Smoking Concert which had been arranged for the purpose of bidding 'Good-bye' to Serjeant Adam McNeill, on leaving the Corps after twenty-one years' faithful service. The other participants in the honour were Serjeant Baker and Corporal Moon, who are leaving the Island later on.

"Serjeant-Major Collard occupied the chair and conducted the proceedings, which were of a highly enjoyable character.

"At 8.30 the harmony was opened by Serjeant-Major Collard with 'Ma darling Sue,' followed by 'The Song of the Thrush' by Corporal Sedgley, 'Quite English, you know,' by Sergeant Kirby and 'A Beautiful Picture,' by Corporal Chipperfield.

"The toast of 'The King' was proposed by the President and enthusiastically honoured, the programme, prefaced by a pianoforte solo 'Alice where art thou?' by Lance-Corporal Davies, Gloucestershire Regiment, being then proceeded with as follows:—'Out on the Deep,' Quartermaster-Serjeant Jones, 'One too Many,' Serjeant Talbot, 'Annie Laurie,' Serjeant-Major Collard.

"At this stage of the proceedings the Officers arrived, namely, Lieutenant-Colonel A. F. Russell, C.M.G., Major M. H. Babington, Major Evans, Captain W. L. Baker, and Major and Quartermaster H. G. Hasell.

"Mr. Kaine, Barrack Warden, having given an exceedingly humorous rendering of 'Take it Bob,' Serjeant-Major Collard proposed the toast of 'Our Officers.'

"In a very neat and appropriate speech he emphasized the pleasure at all times afforded by the presence of the Officers. He reviewed the marked progress which followed the amalgamation of the Army Medical Staff and Medical Staff Corps in 1898, and proudly asserted that the Corps had realized the grandest expectations in the eyes of the service. It was to the Officers that all this was due. This year was a record year, no less than fourteen men having passed out as trained nurses, and the number of those who qualified for Dispensers and presented themselves as candidates for promotion was in excess of former years. In sport, the Corps was second to none, having rendered a good account in swimming, football, cricket and other forms of sport. The honour of being the premier Company rested with No. 30 Company and he was sure it would be maintained. In continuation Serjeant-Major Collard gave expression to the regret which was generally shared at the approaching departure of Colonel Russell on promotion to Egypt. It was a pleasing recollection that he had served under Colonel Russell in Gibraltar as pay clerk when a private and now as Serjeant-Major; he regretted taking leave of him in Malta. The high standard of discipline and efficiency was due to Colonel Russell, who as an example to the men had become a total abstainer. In conclusion, Sergeant-Major Collard welcomed Colonel Sloggett with whom he served two years in the Connaught Hospital, Aldershot, and also Major Evans, wishing them a happy sojourn on the station.

"Major Hasell kindly obliged with 'Mary was a Housemaid,' and the 'Ballymoney Conversazione' as an encore.

"'Flight of Ages' by Sergeant Kirby and the 'Presbyterian Cat,'' by Serjeant-Major Collard having been severally well rendered, Serjeant-Major Collard rose to perform the ceremony of the evening, which was that of presenting a gold watch and pair of sleeve links to Serjeant McNeill on leaving the service. He described Serjeant McNeill as one of the most efficient, hard-working and conscientious non-commissioned officers he had ever served with. The presentation was made amidst loud applause.

"After Mr. Kaine had sung 'Finnegan's Wake,' Serjeant McNeill did his best to respond, but the parting was evidently too much for him, and he hoped the company would accept the gratitude which he was unable to express.

"Apologies were read from ex-Serjeant-Major Dudman and Serjeant Ellis (Forrest Hospital).

"After 'The Trumpeter' by Serjeant-Major Collard, 'Juanita' by Serjeant Kirby and other songs had been disposed of, a visitor on behalf of Mr. Kaine and Mr. Smith returned thanks for the warmth of the reception accorded them, at the same time proposing the health of the President, which was received with applause and musical honours, which Serjeant-Major Collard duly acknowledged.

"'Auld Lang Syne' was then sung in real Scotch style as Serjeant McNeill was being carried round the room, 'God Save the King' bringing the evening to a close.

"The greatest praise is due to the Committee, composed of Quartermaster-Serjeant Gibbs, Serjeant-Major Elliott, Corporal Arnold and Corporal Moon Corporal Chipperfield's catering was excellent, and Corporal Davies, Gloucester Regiment, at the piano, largely contributed to a complete success.

"On the 28th inst., the company held their Annual Quadrille Party; this marks the opening of winter season for the Junior Non-Commissioned Officers' and Men's fortnightly dances.

"At a recent regatta, Captain P. Stewart and Captain W. I. Baker successfully sailed the Royal Army Medical Corps Skiff 'Midget,' and took first place prize for boats under 18 ft. This is a third first prize out of a possible three this season.

"Cricket analyses for the season are as follows.—

Batting Averages.

	Innings	Runs	Highest score	Not out	Average
Captain Beaman	12	386	111	1	32·66
Major Thurston	16	460	88	1	30·67
Captain Gibson	9	266	80	—	29·66
Major Norrington	9	233	67	—	25·89
Serjeant-Major Huntingford	19	316	73	2	18·59
Private Morrison	2	32	32	—	16·00
Corporal Martin	18	198	60	2	12·37
Private Sayers	14	120	41	4	12·00
Corporal Staff	12	104	18	3	11·56

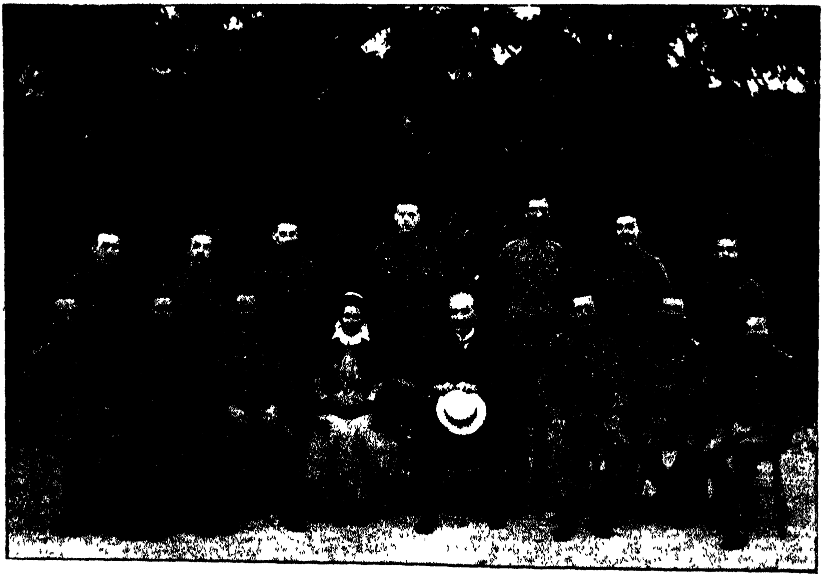
	Innings	Runs	Highest score	Not out	Average
Serjeant Talbot	14	144	34	—	10·29
Private Burns	15	155	42		10·33
Corporal Turner	9	69	19	2	9·86
Captain Suhr	5	48	12	—	9·60
Corporal Hutchings	17	134	21	3	9·57
Private Grogan	8	53	21	2	8·83
Serjeant-Major Dudman	9	46	18	3	7·67
Private Whittaker	2	13	10	-	6·50
Private Alloway	7	29	11	2	5·87
Lance-Corporal Hyde	2	4	4	1	4·00

Bowling Averages.

	Runs	Wickets	Maidens	Overs	Average
Corporal Martin	44	6	8·3	—	7·33
Major Thurston	240	23	59·3	8	10·43
Serjeant-Major Dudman	422	34	112·2	20	12·12
Private Burns	257	16	75·0	6	16·10
,, Grogan	377	22	113·0	19	17·14
Corporal Hutchings	519	30	141·5	22	17·30
Captain Beaman	630	32	129·0	5	29·68

"Major C. R Evans, who arrived on H M.T. 'Somali,' will prove an acquisition to the team next season.

"Lieutenant-Colonel H M Sloggett arrived on the 22nd inst., and has taken over the command of 30th Company, Royal Army Medical Corps, and charge of Military Hospital, Cottonera."



Pte Deans Pte. Knaggs Pte Gosling Pte. Alloway Serjt Gibson Pte. King Serjt. Talbot
Miss J Hoadley, R.R.C (Matron) Lieut -Col A F. Russell, C.M.G., M.B., R.A.M.C.
Pte. Pearce Pte. Posner Serjt.-Major F. E. Collard Pte. Nann, Pte. Richardson, Pte. Flavell

NOTES FROM CAIRO.—Lieutenant J. A. Clark, R.A.M.C., writes: "After a successful season at cricket, the Company have finally carried off the Small Units Championship Cup at the Army of Occupation Athletic Sports, held at Abbassiyeh, Cairo, on September 20, 21, 22, and 23, 1911. (Photo of team on next page.)

"*Events.*—Long Jump: 1st, Lance-Serjeant Kay, R.A.M.C., 17 ft. 8¼ in.; 2nd Brigadier Sweeney, R.G.A., 17 ft. 8 in.; 3rd, Serjeant Gosling, R.A.M.C., 17 ft. 7 in. High Jump: 1st, Brigadier Allen, R.H.A., 4 ft. 8 in.; 2nd, Serjeant Kay, R.A.M.C.; 3rd, Lance-Corporal Gartland, A.S.C., and Gunner Slater, R.H A., tie. 100 Yards: 1st, Lance-Serjeant Kay, R.A.M.C.; 2nd, Lance-Corporal Gartland, A.S.C.; 3rd, Lance-Corporal Notting, R E. 1 Mile: 1st, Gunner Morgan, R.G.A.; 2nd, Private Paskell, R.A.M.C.; 3rd, Brigadier Allen, R.H.A. Relay Race: 1st, R.A.M.C. (Team—Serjeant Gosling, 220 yd., Serjeant Kay, 440 yd., Private Christie, 220 yd., Private Brown, 883 yd.); 2nd, A.O C.; 3rd, R.H.A. ½ Mile: 1st, Gunner Morgan, R.G.A.; 2nd, Private Paskell, R.A.M.C.; 3rd, Lance-Corporal Gartland, A.S.C. Hurdles: 1st, Sapper Holmes, R.E.; 2nd, Brigadier Sweeney, R.G.A.. 3rd, Lance-Serjeant Kay, R.A.M.C. ¼ Mile: 1st, Lance-Corporal Gartland, A.S.C.; 2nd, Private Paskell, R.A.M.C.; 3rd, Brigadier Morgan, R.G.A.

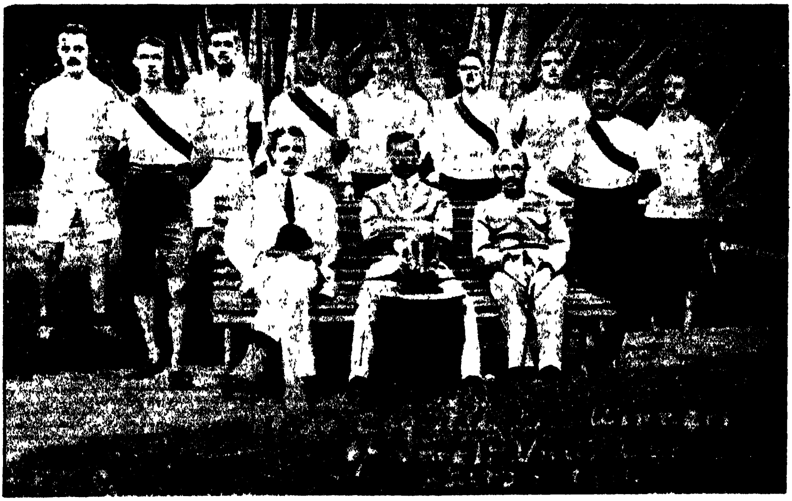
"Points towards the Cup: 1st, R.A.M.C., 19 points; 2nd, R.G A., 12 points.

"The following are the strengths of the Units competing. T. Battery, R.H.A., 167; R.E., 132; R.G.A. (Mountain Battery), 126; R.A M.C., 78; A.S.C., 66; A.O.C., 30.

"Last year the Championship Cup was won by the Royal Engineers.

"This year a great deal of interest was taken by the officers, especially the Commanding Officer, Lieutenant-Colonel W W. Pike, D.S.O., R.A.M.C. (himself an old International Athlete), and Lieutenant J. A. Clark, R.A.M C., who assisted in coaching the men. Private J. T. Christie also gave the greatest assistance in maintaining the enthusiasm of the team.

"At the close of the cricket season we occupied second place in the Small Units Cricket League. In all 12 matches were played, out of which we won 5, lost 2, drew 2, and claimed points in the remaining 3 matches as our opponents were unable to put in an appearance. Serjeant Keeble, Lieutenant Elvery, Corporal Cleave, and Private Paskell all did good work with the bat, while the most successful bowlers were Lieutenant Elvery, Serjeant Keeble, Private Paskell, and Private Burr."



NOTES FROM SIMLA.—Colonel R. S. F. Henderson, K H.P., R.A.M.C., Secretary to the Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated September 21, 1911:—

"*Appointments.*—The Royal Army Medical Corps officers appointed to the command of station hospitals at divisional and brigade headquarters and hill stations, detailed for service in Burma and Aden, &c., are shown in the statement attached hereto.

"Major J. McD. McCarthy, R.A.M.C., is appointed Sanitary Officer, 2nd (Rawal Pindi) Division.

"*Leave.*—The grant of general leave to the undermentioned officers has been concurred in: Major H. K. Palmer, R.A.M.C., for six months, from October 1, 1911; Major M. P. Corkery, R.A.M.C., for six months, from October 1, 1911.

"The leave granted to Major R. J. Copeland and Captain H. W. Farebrother, R A.M.C., has been extended by six months and one month respectively, on the recommendation of medical boards.

"*Service.*—Lieutenant-Colonel C. E. Nichol, and Captain R. T. Brown, R.A.M.C., have been granted extensions of their tour of service in Burma until further orders, and for one year respectively.

"*Specialists.*—Major H. O. B. Browne Mason, R.A.M.C., has been appointed Specialist in Dermatology, 6th (Poona) Division.

"Major B. Watts, R.A.M.C., has been appointed Specialist in Midwifery, 7th (Meerut) Division.

"LIST OF OFFICERS APPOINTED.

"I.—TO COMMAND STATION HOSPITALS AT DIVISION AND BRIGADE HEADQUARTERS.

Rank and Name	Station	Date of appointment	Date of completing tenure	Remarks
		Northern Army.		
Lieut.-Col. T. Daly	Peshawar ..	April, 1911	April, 1914	—
Major L. F. Smith	Nowshera ..	Nov., 1911	Nov., 1913	—
Lieut.-Col. A. E. Tate ..	Rawal Pindi	Feb., 1912	Feb., 1915	—
,, H. J. Fletcher ..	Sialkot ..	May, 1909	May, 1913	By extension
Major E. M Hassard ..	Lahore Cantonment	June, 1910	June, 1913	,,
Lieut.-Col. G. F. H. Marks ..	Ferozepore ..	Feb., 1910	Feb., 1913	,,
,, E. G. Browne ..	Jullundur ..	,, 1912	,, 1915	—
,, H. Carr	Ambala ..	,, 1912	,, 1915	—
,, E. H. L. Lynden-Bell	Meerut ..	Nov., 1909	Nov., 1912	—
,, S. C. Philson ..	Bareilly ..	Aug., 1910	Aug., 1913	—
,, H. N. Thompson, D.S.O., V.H.S.	Lucknow ..	March, 1909	March, 1913	By extension.
,, R. W. Wright ..	Fyzabad ..	Oct., 1911	Oct., 1914	—
,, J. S. Davidson..	Allahabad ..	,, 1909	,, 1912	By extension.
Major F. Smith, D.S.O. ..	Calcutta ..	,, 1911	,, 1914	—
		Southern Army.		
Lieut.-Col. F. W. C. Jones ..	Quetta ..	Jan., 1911	Jan., 1914	—
Major E. C. Anderson ..	Karachi ..	June, 1911	..	Temporary.
Lieut.-Col. G. E. Hale, D.S.O.	Mhow ..	March, 1911	March, 1914	—
Major C. W. R. Healey ..	Nasirabad ..	April, 1910	April, 1913	By extension.
Lieut.-Col. R. J. Geddes, D.S.O.	Jubbulpore ..	Feb., 1909	Feb.. 1913	,,
Major R. C. Elliott	Jhansi ..	Oct., 1911	Oct., 1913	—
Lieut.-Col. R. H. Preston ..	Poona ..	Jan., 1910	Jan., 1913	—
,, A. T. I. Lilly ..	Belgaum ..	Oct., 1909	Oct., 1912	—
,, C. C. Reilly ..	Colaba ..	March, 1912	March, 1915	—
Major J. Girvin	Ahmednagar	,, 1911	,, 1914	—
Lieut.-Col. J. S. Green ..	Bangalore ..	Oct., 1911	Oct., 1914	—
,, C. A. Lane ..	Madras ..	March, 1912	March, 1914	—
,, G. G. Adams ..	Secunderabad	,, 1912	,, 1915	—
,, C. E. Nichol ..	Maymyo ..	Jan., 1910	..	Extended till further orders.
,, C. T. Blackwell ..	Rangoon ..	May, 1911	May, 1913	—

"II.—To Command Station Hospitals at Hill Stations.

Rank and name	Station	Date of appointment	Date of completing tenure
Northern Army.			
Major H. I. Pocock	Murree ..	Nov., 1911	Nov., 1913
Lieut.-Col. J. Ritchie	Dalhousie ..	April, 1911	April, 1913
Major S. H. Withers	Dagshai ..	March, 1912	March, 1914
Captain P. C. T. Davy	Jutogh ..	July, 1910	July, 1912
Lieut.-Col. M. P. C. Holt, D.S.O., V.H.S.	Kasauli ..	Feb., 1911	Feb., 1913
Major G. J. A. Ormsby	Landour ..	Dec., 1911	Dec., 1913
Lieut.-Col. G. H. Barefoot	Ranikhet ..	Aug., 1910	Aug., 1912
Major W. Hallaran	Chakrata ..	Oct., 1911	Oct., 1913
,, H. Herrick..	Naini Tal ..	,, ,,	,, ,,
,, J. D. Alexander	Darjeeling ..	March, 1911	March, 1913
,, G. M. Goldsmith	Lebong ..	,, 1912	,, 1914
Southern Army.			
Major E. W. Slayter	Mount Abu ..	Oct., 1911	Oct. 1913
,, A. G. Thompson	Pachmarhi .	March, 1912	March, 1914
,, J. C. Connor	Wellington ..	,, ,,	,, ,,

"III.—Aden Reliefs.

"(1) Lieutenant-Colonel* H. H. Brown, 2nd (Rawal Pindi) Division, *vice* Lieutenant-Colonel R. L. R. Macleod, sailing by the 3rd Transport 'Plassy,' November 9, 1911, from Bombay.

* To command Station Hospital, Aden.

"(2) Captain R. R. Argles, 3rd (Lahore) Division, *vice* Major T. H. J. C. Goodwin, D.S.O., sailing by the 3rd Transport 'Plassy' November 9, 1911.

"(3) Captain G. De la Cour, 9th (Secunderabad) Division, *vice* Captain A. D. O'Carroll, sailing by the 9th Transport 'Dongola,' February 23, 1912, from Bombay.

"(4) Captain A. Dawson, D.P.H., 9th (Secunderabad) Division, for charge of Brigade Laboratory, *vice* Captain E. W. Powell, D.P.H., sailing by the 3rd Transport 'Plassy,' November 9, 1911, from Bombay.

"(5) Captain J. W. L. Scott, 4th (Quetta) Division, *vice* Captain G. W. W. Ware, sailing by the 3rd Transport 'Plassy,' November 9, 1911, from Bombay.

"IV.—Burma Reliefs.

"(*a*) *To be Transferred from Burma* (1911-12).

"Major G. M. Goldsmith, 8th (Lucknow) Division, Lebong; Captain A. E. B. Jones, 9th (Secunderabad) Division, Wellington.

"(*b*) *To be Transferred or Posted to Burma* (1911-12).

"Major L. Wood, England; Captain J. Tobin, England. Captain H. W. Farebrother, 9th (Secunderabad) Division: Captain J. F. Grant, 8th (Lucknow) Division. Lieutenant C. T. V. Benson, England: Lieutenant J. R. Yourell, England.

"V.—Embarkation Medical Officers.

"*For Duty in Connection with Embarkation and Disembarkation of Troops and Invalids during the Season* 1911-12.

"Captain J. A. Bennett, Bombay. Major W. P. Gwynn, Karachi."

PROMOTIONS.

Quartermaster-Serjeant.

12668	S.-Serjt ..	Sellex, G.	29.7.11	*Vice* J. W. Willsher, Sup. At. War Office.

DISCHARGES.

18039	Corporal	Wood, P. R.	10. 9.11	Payment of £18.
12175	Lce.-Corpl.	Murphy, W.	20. 9.11	Free after 12 years.
14673	,,	Didron, G.	5.10.11	Medically unfit.
4672	Private	Templeton, M. R.	21. 9.11	,, ,,
12556	,,	Rayner, W.	24. 9.11	Termination of first period
7362	,,	Garden, W.	25. 9.11	After 3 months' notice.
9381	,,	Ross, C. E.	23. 9.11	Medically unfit.
19312	,,	Turner, W.	29. 9.11	,, ,,
19042	,,	Sim, W. H.	30. 9.11	Free after 12 years.
5585	,,	Howe, W. H.	26. 9.11	Payment of £10.
8934	,,	Snee, H.	5.10.11	Termination of second period
8960	,,	James, F. E.	6.10.11	,, ,, ,,
299	,,	Fishlock, G.	12. 9.11	,, ,, ,,

TRANSFERS TO ARMY RESERVE.

1965	Pte.	Downing, S. F.	10.9.11	2035	Pte	Steele, J.	30. 9.11
1987	,,	Herbert, J. C.	13.9.11	2026	,,	McCarthy, T.	27. 9.11
1966	,,	Jones, J. P.	10.9.11	2024	,,	Hurley, M. J.	27. 9.11
18992	L.-Cpl	Brennan, R. J.	11.9.11	2033	,,	Corcoran, D.	29. 9.11
1994	Pte	Brand, H. G.	14.9.11	2036	,,	Fox, J. R.	1.10.11
1986	,,	Davis, W.	13.9.11	2018	,,	Doran, F.	2.10.11
1980	,,	Jacobs, G. E.	10.9.11	2041	,,	Poole, F. C.	2.10.11
1992	,,	Mouncey, A.	13.9.11	2047	,,	Nesbitt, W.	2.10.11
1989	,,	White, P. C.	13.9.11	19292	,,	Hand, T.	4.10.11
19240	L.-Cpl.	Seasbrook, T. C. S.	11.9.11	2067	,,	Glover, A.	12.10.11
2014	Pte.	Durkin, J.	21.9.11	2058	,,	Lilley, W.	7.10.11
2017	,,	Smyth, J.	21.9.11	18950	,,	Fielder, A. J.	4.10.11
2007	,,	Morrell, A. F.	20.9.11	2050	,,	Warner, F. A.	5.10.11
1252	,,	Wickers, P.	22.9.11	19297	,,	Rote, F. H.	5.10.11
19265		Armstrong, F.	21.9.11	2037	,,	Goulding, B.	1.10.11
2016	,,	Shipton, W. J.	21.9.11	2038	,,	Neville, M.	1.10.11
2011	,,	Curtis, A. F.	21.9.11	2049	,,	O'Regan, J.	4.10.11
2000	,,	Jefferies, C. J.	20.9.11	19301	,,	Richardson, H.	6.10.11
19255	,,	Foster, P. T. H.	18.9.11	2052	,,	Berrett, S. J.	5.10.11
2023	,,	Riordan, D.	20.9.11	2043	,,	Barleycorn, F. J. T.	5.10.11
2015	,,	Hayward, S. E.	21.9.11	2055	,,	Covell, C.	7.10.11
19880	,,	Parkings, A. L.	22.9.11	2062	,,	Hope, C.	9.10.11
2021	,,	Richards, F.	23.9.11	2057	,,	Hough, J. W.	7.10.11
2020	,,	Field, J. B.	23.9.11	2060	,,	Hoult, E.	9.10.11

TRANSFERS FROM OTHER CORPS.

5755	Private	Wilkins, C. F.	11.9.11	From Royal Engineers.
5772	,,	Loft, A. C.	28.9.11	,, Army Service Corps.

TRANSFERS TO OTHER CORPS.

5587	Private	Rogers, W. H.	4.10.11	To Army Service Corps.
5586	,,	Smith, C. A.	9.10.11	,, 1st Gloucestershire Regt.

EMBARKATIONS FOR ABROAD.

To Egypt, per H.M.T. "Soudan," September 13, 1911.

16402	S.-Serjt.	Colls, S. R.	1998	Private	Patrick, E.
1805	Private	Geary, B.	2124	,,	Butt, W.
2148	,,	Ashcroft, J.	1962	,,	Shorten, G.

TO SIERRA LEONE, PER S.S. "OLENDA," SEPTEMBER 21, 1911.

19618	Corporal ..	Bettison, P.	17825	Corporal ..	Moore, N.

TO EGYPT, PER H.M.T. "ROHILLA," OCTOBER 4, 1911.

1648	Private ..	Nye, H. V. G.	1939	Private ..	Sawers, W
4696	,, ..	Phillips, A. E.	2034	,, ..	Beck, H. F.
4803	,, ..	Foggin, W.			

TO SINGAPORE, PER H.M.T. "ROHILLA," OCTOBER 4, 1911.

18890	Serjeant ..	Moore, J.	2006	Private ..	Bray, J. F
18145	,, ..	Elliott, F. H	18697	,, ..	Shenton, R G.
16564	,, ..	Vickers, C.	19064	,, ..	Marshall, W. E.
19031	Lce.-Corpl.	Leahy, J.	19175	,, ..	Stow, F E.
18512	Private ..	Walkden, J.	1946	,, ..	Jane E.
1578	,, ..	Savage, E.	2119	,, ..	Tonilo, A.
1603	,, ..	Dolan, B	2266	,, ..	Mills, T. S.

TO GIBRALTAR, PER H.M.T. "ROHILLA," OCTOBER 4, 1911.

1810	Private ..	Griffiths, R. E.	1791	Private ..	Elsey, P.
1813	,, ..	Bridgman, P. W	2002	,, ..	Cradduck, G.
18628	,, ..	Pemberton, G.	2031	,, ..	Huppler, R
1797	,, ..	Mudge, W.			

TO HONG KONG, PER H.M.T. "ROHILLA," OCTOBER 4, 1911.

11419	S.-Serjt. ..	McClelland, J. H.	2063	Private ..	Crofts, C.
10638	Serjeant ..	George, T.	1973	,, ..	Elliott, W.
11814	Corporal ..	Herington, A. E.	1898	,, ..	Daly, M.
2046	,, ..	Hammond, F. J.	19060	,, ..	Kay, C. L.
1945	Private ..	Chapman, J.	2032	,, ..	Wood, R R.
1360	,, ..	Doyle, J.	5164	,, ..	Dowding, A. J
18251	,, ..	Ovendon, E. E.	2039	,, ..	Tomson, H.
1556	,, ..	Calvert, N. B.	1971	,, ..	Cox, J.

TO MALTA, PER H.M.T. "ROHILLA," OCTOBER 4, 1911.

10024	S.-Serjt. ..	Lampard, G.	1978	Private ..	Moffett, L. W
19419	Private ..	Clark, W. G. W.	1935	,, ..	Harple, F.
1520	,, ..	Spalding, A. J.	4455	,, ..	Nice, T. J.
2013	,, ..	Connell, W. J.	1903	,, ..	Reynolds, A. A.
2054	,, ..	Berry, G. H	2198	,, ..	Duggan, J. H W.
19289	,, ..	Mills, F. J.	1949	,, ..	Smith, B
4331	,, ..	Gardiner, J.	2009	,, ..	Latimer, H.

TO CEYLON, PER H.M.T. "ROHILLA," OCTOBER 4, 1911.

19249	Private ..	Caste, J.	2010	Private ..	Merriman, P.
1740	,, ..	Ardery, A. H.	19303	,, ..	Green, R. T
19454	,, ..	Renshaw, E. S.			

DISEMBARKATIONS FROM ABROAD.

FROM SOUTH AFRICA, PER S.S. "DUNBAR CASTLE," SEPTEMBER 2. 1911.

10	Private ..	Cushing, G. F.			

FROM EGYPT, PER H.M.T. "SOUDAN," OCTOBER 8, 1911.

11946	Serjeant ..	Gosling, E. J.	19085	Lce.-Corpl.	Vinton, C. J.
19726	Private ..	Doffee, E. T.	19336	Private ..	Barnes, A
2281	,, ..	Edington, T.	19534	,, ..	Fountain, H. W.

FROM MALTA, PER H.M.T. "SOUDAN," OCTOBER 9, 1911.

10691	Lce.-Serjt.	McNeill, A.	19957	Private ..	Blake, H.
14690	Corporal ..	Syckelmore, G. W.	16261	,, ..	Wheeler, G. R.
19376	Private ..	Buss, F. E.			

From Gibraltar, per h.m.t. "Soudan," October 9, 1911.

9430	Serjeant ..	Trotter, T. E.	1930	Private ..	Burden, F.
18243	Lce.-Corpl.	Vincent, W.	178	,, ..	Wilkinson, A. E.
133	Private ..	Waggett, H.	19881	,, ..	Woodroffe, B.

THE FOLLOWING N.C.O's. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

For Staff-Serjeant.

10830	Serjeant ..	Davidson, A.	16265	Serjeant ..	Simes, P. T.
15813	,,	Heggie, A. V.	17736	,, ..	Keeble, J. D

For Serjeant.

12669	Lce.-Serj.	Grinham, C. W ..	11275	Lce.-Serj.	Breewood, A
16304	,,	Langley, A.	19396	Corporal ..	Baker, H
18988	Corporal ..	Haigh, R. H. T. ..	16130	,, ..	Lacey, W.

For Corporal.

19150	Private ..	Messenger, T. H.	18137	Private ..	Jones, J. W.
4895	,, ..	Gill, W. H.	14961	,, ..	Monk, A.
1359	,, ..	Collier, W. N.	1539	,, ..	Catlin, F. G.
1598	,, ..	Bryant, E. C.	2106	,, ..	Macdonald, J.
19128	,, ..	Burr, W. G.	728	,, ..	Brooks, A. T.
19791	,, ..	Hossack, F. G.	609	,, ..	Day, J.
2180	,, ..	Rogers, T. W. G.	5369	,, ..	Macfie, T. G.
178	,, ..	Wilkinson, A. E.	841	,, ..	Johnstone, B. D.
873	,, ..	Crook, W.	911	,, ..	Clough, W.

No. 18149 Serjeant A. H. Godfrey has been selected for service under the Colonial Office for duty on the Bauchi Branch of the Railway in Northern Nigeria.

No. 17857 Serjeant A. E. Macklen has been selected for service with the Egyptian Army.

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

Captain Charles R. Tichborne resigns his commission, dated October 4, 1911.

The undermentioned Lieutenants are confirmed in their rank: Robert McLinnell, John R. R. Trist, William R. Gardner, Vivian R. Smith, Percival T. Priestley.

To be Lieutenant (on probation). Henry Meredith Buchanan, M.B., dated August 10, 1911.

TERRITORIAL FORCE.

Honourable Artillery Company.

Surgeon-Major Edward H. Myddelton-Gavey resigns his commission, retires into the Veteran Company, and is granted permission to retain his rank and to wear the prescribed uniform, dated October 4, 1911.

Yeomanry.

Royal East Kent (The Duke of Connaught's Own Mounted Rifles) Yeomanry.—Surgeon-Lieutenant Campbell T Fox to be Surgeon-Captain, dated August 26, 1911.

Royal Engineers.

2nd London Divisional Engineers, Royal Engineers.—Surgeon-Major William H. Bourke, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated October 4, 1911.

Infantry.

4th Battalion The Welsh Regiment.—Surgeon-Lieutenant William R. E. Williams, M.B., to be Surgeon-Captain, dated July 30, 1911.

4th Battalion, The Oxfordshire and Buckinghamshire Light Infantry.—Surgeon-Major Julius O. Sankey retires, under the conditions of paragraph 116 of the Territorial Force Regulations, and is granted permission to retain his rank and to wear the prescribed uniform, dated October 7, 1911.

ROYAL ARMY MEDICAL CORPS.

1st Home Counties Field Ambulances, Royal Army Medical Corps.—Lieutenant Sidney W. Milner resigns his commission, dated October 4, 1911.

1st London (City of London) Field Ambulance, Royal Army Medical Corps.—Lieutenant Arthur Donald John Bedward Williams, from the List of Officers attached to Units, to be Lieutenant, dated September 7, 1911.

2nd Eastern General Hospital, Royal Army Medical Corps.—Hugh Nethersole Fletcher, F.R.C.S.Edin., to be Captain, dated October 4, 1911.

Frederick Arundel Stewart Hutchinson, M.D., to be Captain, dated October 4, 1911.

1st Western General Hospital Royal Army Medical Corps.—Captain Robert C. Dun, M.B., F.R.C.S.Eng., resigns his commission, dated October 7, 1911.

Eastern Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Lieutenant Oliver Smithson resigns his commission, dated October 11, 1911.

5th London Field Ambulance Royal Army Medical Corps.—John Pomeroy Grainger to be Lieutenant, dated September 28, 1911.

3rd North Midland Field Ambulance, Royal Army Medical Corps.—Major Howard H. C. Dent, M.B., F R.C.S., to be Lieutenant-Colonel, dated September 5, 1911.

1st Welsh Field Ambulance Royal Army Medical Corps.—Lieutenant John O'Sullivan to be Captain, dated June 19, 1911.

Officers (Attached to other Units).

Horace Guy Lankester Haynes (late Cadet Serjeant, Cambridge University Contingent, Senior Division, Officers Training Corps) to be Lieutenant, dated June 18, 1911.

Captain Charles Ernest Goddard, M.D., from 1st London (City of London) Sanitary Company, Royal Army Medical Corps, to be Major, dated July 3, 1911.

The undermentioned officers resign their commissions, dated October 4, 1911: Captain George R. F. Stillwell, M.B., Lieutenant Herbert P S. Devitt.

Robert Craig Dun, M.B., F.R.C.S.Eng. (late Captain, 1st Western General Hospital, Royal Army Medical Corps) to be Lieutenant, dated October 7, 1911.

Captain David Walker to be Major, dated July 27, 1911.

Supernumerary Lieutenant David A. Hughes to be Captain. (To remain supernumerary), dated July 28, 1911.

Captain Herbert Meggitt resigns his commission, dated October 7, 1911.

Captain Alexander H. Pirie, M.B., resigns his commission, dated October 7, 1911.

Captain John Forbes, M B., resigns his commission, dated October 7, 1911.

Captain George H. Goldsmith, M.D., resigns his commission, dated October 11, 1911.

Surgeon-Captain William Reginald Eyton Williams, from the 4th Battalion The Welsh Regiment, to be Captain, dated October 11, 1911.

The King has been graciously pleased to confer the Territorial Decoration upon the undermentioned officers of the Territorial Force who have been duly recommended for the same under the terms of the Royal Warrant, dated August 17, 1908 :—

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Archibald Kerr Chalmers, M.D , Sanitary Officer of the Lowland Territorial Division.

Major Robert Rannia, M B., attached to the 7th (Deeside Highlanders) Battalion, The Gordon Highlanders.

Major Walter Alexander Atkinson, M.D., attached to the 21st (County of London) Battalion, the London Regiment (First Surrey Rifles).

Major Walter Moffett Hamilton, M.D., attached to the 7th Battalion, the Lancashire Fusiliers.

Major Charles Thomas Griffiths (retired list).

Captain Robert Thomson Ferguson, M.D. (retired list).

The King has been graciously pleased to confer the Volunteer Officers' Decoration upon Lieutenant-Colonel German Sims Woodhead, M.D., Sanitary Service, Royal Army Medical Corps, Territorial Force.

THIRD HOME COUNTIES FIELD AMBULANCE, ROYAL ARMY MEDICAL CORPS.

COMPLIMENTARY DINNER.

A complimentary dinner was given on Wednesday evening at the Grand Hotel, Trafalgar Square, to Captain F. M. Parry, R.A.M.C., late Adjutant Royal Army Medical

Corps School of Instruction, Home Counties Division, by the officers of Territorial Royal Army Medical Corps Units of the Division. The chair was taken by Colonel J. Turton, F.R.C.S., V.D., the Administrative Medical Officer Home Counties Division, and he was supported by Lieutenant-Colonel C. P. Oliver, M D., 1st Home Counties Field Ambulance; Lieutenant-Colonel D. L. Hamilton, 2nd Home Counties Field Ambulance, Lieutenant-Colonel J. J. de Zouche Marshall, 3rd Home Counties Field Ambulance; Lieutenant-Colonel C. J. Jacomb-Hood, 2nd Eastern General Hospital; Lieutenant-Colonel M. W. Russell, R.A.M.C., Staff Officer to Principal Medical Officer, Eastern Command; Major G. A. Edsell, M.D.; Captain F. M. Parry, R.A.M.C.; Captain H. H. J. Fawcett, R.A.M.C. (Captain Parry's successor); Lieutenants Flint, Houchin and Willan, 2nd Home Counties Field Ambulance; Lieutenants Coad, Mackenzie and Barkley, 3rd Home Counties Field Ambulance. Major and Quartermaster Briscoe, 2nd East General Hospital, and Lieutenant T. South, 8th Battalion, Middlesex Regiment; and Messrs. Robert Gould, C.E., J. W. Marshall and C de Z. Marshall. Lieutenant-Colonel Marshall acted as Hon. Secretary.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurse Miss B. L. Cooper, Miss B. E. Smith, Miss E. W. Bond, Miss M. Nicholson.

Appointments Confirmed.—Staff Nurses Miss A Bradley, Miss V. L. W. Bird, Miss M. M. Roberts, Miss E. M. Whittall, Miss R. C. S. Carleton, Miss I. McM. Beaton.

Postings and Transfers.—Sisters: Miss N. Blew, to Hong Kong, from Tidworth, Miss M. M. Bond, to Royal Arsenal Hospital, from Royal Herbert Hospital; Miss R. Osborne, to York, as Matron, from Woolwich; Miss D J. Saunder, to Malta, from Woolwich. Staff Nurses: Miss M. E. Smith, to Hong Kong, from Woolwich, Miss J. G. Dalton, to Pretoria, from Bloemfontein.

Arrivals.—Miss E. M. Rentzsch, Sister, from Malta.

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON WEDNESDAY, OCTOBER 18, 1911, AT 3 P.M., IN ROOM 357.

Present.

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S President, in the Chair.
Surgeon-General W. Donovan, C.B.
Colonel Sir James Clark, C.B, Bart.
Colonel E. J. Risk.
Lieutenant-Colonel E. M. Wilson, C.B., C M.G., D.S.O.
Major E. M. Pilcher, D.S.O.
Major E. T. F. Birrell.

(1) The Minutes of the last Meeting were read and confirmed

(2) A letter was read from Colonel J. Lane Notter, regretting his inability to attend this meeting.

(3) With reference to Minute 6 of the last Meeting, Surgeon-General Donovan said that Major Bruce, R.A.M.C., recently brought up the fact at a meeting of the Royal Army Medical Corps Committee, that no provision was made for the orphans of Quartermasters of the Corps who were left destitute. Surgeon-General Donovan was of opinion that the time had now come to admit the orphans of Quartermasters to the benefits of this Society. He, therefore, proposed and it was resolved that the following Resolution should be recommended to the next Annual General Meeting for adoption:—

"That the Quartermasters of the Corps be admitted unconditionally to such benefits of the Society as might be proposed from time to time by the Committee and confirmed by the Annual General Meeting."

(4) The Secretary read an application from the widow of the late Brigade-Surgeon Lieutenant-Colonel H. R. G., asking for a grant to enable her daughter, aged 25, to take lessons in typewriting and shorthand. It was resolved that as the orphan is over the age of 21 no grant could be made, there being no special reason for so doing under Rule 4.

(5) The Secretary read a letter from Lieutenant-Colonel J. Martin resigning his Trusteeship to the Society. It was resolved that Lieutenant-Colonel Martin's resignation be accepted with regret and that a vote of thanks be recorded for his past services.

(6) It was proposed by Surgeon-General Donovan, and seconded by Lieutenant-Colonel Wilson, that Sir James Roderick Duff McGrigor, Bart., be invited to become a Trustee, and that if he accepts, the Secretary shall apply to the Bankers to take steps to alter the script of all stocks and shares accordingly, and that Sir James Roderick Duff McGrigor, Bart., be hereby appointed a Trustee to the Society in the place of Lieutenant-Colonel J. Martin, resigned. Carried *nem. con.*

F. W. M. Davie Harris, *Lieutenant-Colonel,*
Secretary.

ROYAL ARMY MEDICAL CORPS FUND.

Proceedings of a Committee Meeting held at the War Office on Wednesday, October 18, 1911, at 2.30 p.m., in Room 357

Present.

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., Chairman in the Chair.
Surgeon-General W. Donovan, C.B.
Surgeon-General W. Babtie, V.C., C.M.G.
Colonel F. J. Risk.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Major E. M. Pilcher, D.S.O.
Major A. Bruce.
Major E. T. F. Birrell.
Major G. G. Delap, D.S.O.
Captain L. Cotterill.

(1) The Minutes of the last Meeting were read and confirmed.

(2) It was noted that the following grants were received from Companies for the General Relief Fund for the quarter ending September 30, 1911.

No. 6	Company,	Portsmouth	£5	0	0
,, 8	,,	York	5	1	0
,, 9	,,	Colchester	4	3	0
,, 11	,,	Dover	6	3	6
,, 18	,,	London	2	0	0
,, 20	,,	Tidworth	10	10	0
,, 22	,,	Capetown	5	0	0
,, 23	,,	Pretoria	20	0	0
,, 24	,,	Bloemfontein	20	0	0
,, 25	,,	Bermuda	5	0	0
,, 27	,,	Hong Kong	4	9	5
,, 33	,,	Egypt	6	0	0
			£93	6	11

(3) The grants made from the General Relief Fund during the quarter ending September 30, 1911, were examined and confirmed, and a list of the recipients is appended hereto.—

No.	Name	Age	District	Grant	Total	Remarks
292	Mr. F. E. ..	36	Edinburgh	£4	£ 4	Tubercle. Unfit to work.
293	Mrs. E. M. W.	40	Aldershot..	4	43	Two children to support.
294	Mrs. N. S. ..	69	London ..	4	64	Too old to work.
295	Mr. G. G. ..	31	Northern ..	3	3	Destitute and out of work.
296	Mr. J. W. ..	47	,, ..	4	12	Tubercle. Unfit to work.
297	Mrs. F. L. P. ..	35	London ..	4	20	No visible means of subsistence.
298	Mr. W. F. N...	49	Woolwich	3	13	Suffers from ill-health. No employment.
299	Mrs. S. McC. ..	35	Dublin ..	4	16	Poverty. Three children to support.
300	Mr. H. N. ..	48	London ..	30s.	63	To assist in starting him in work.
301	Mr. H. W. ..	43	,, ..	£4	4	Suffers from Bright's disease.
302	Mrs. A. H. ..	65	Cork ..	3	3	Too old and feeble to work.
303	Mr. C. W. M...	31	London ..	2	2	Destitute and out of work.
304	Mr. A. S. ..	57	Woolwich	3	3	To enable him to make a fresh start.
305	Mrs. B. G ..	32	,, ..	4	8	No means of subsistence.
306	Mrs. N. T. ..	37	Portsmouth	2	2	In poor circumstances.
307	Mrs. K. H. ..	53	Devonport	4	7	Poverty
308	Mr. W. C. D. ..	40	Portsmouth	4	9	Destitute and out of work.
309	Mr. W. G. G. C.	42	Aldershot	4	4	,, ,, ,,

(4) The Aldershot Band accounts, duly audited, were examined and passed, and are attached to these proceedings. A grant of £95 was voted towards the current quarter's expenses.

(5) The proof copies of an amended form of application for General Relief were considered and approved.

(6) The Secretary read a letter from Colonel Peterkin recommending that a grant of £10 should be made from the General Relief Fund to Mr. H. W., late a Staff Serjeant of the Corps, to enable him to start a small business of his own. After considerable discussion it was resolved that the grant should be refused, as the primary object of the Fund is to relieve urgent cases of distress, and there is no precedent for making such a grant for the purpose required.

(7) It was resolved that an application should be made for the admittance of girl Margaret Wilton to the Royal Soldiers' Daughters' Home, on payment from the Compassionate School Fund.

(8) The Secretary read a letter from Mr. Kiddall Armitage offering to sell a portrait of Surgeon-General Sir Charles Cuffe, K.C.B., to the Committee for £52 10s. It was resolved that the offer be not accepted.

(9) A letter was read from Lieutenant-Colonel E. M. Wilson, in which he pointed out that his office expenses in connection with the work of the National Association for the employment of Reserve and Discharged Soldiers were very heavy and that at Aldershot there was not any local fund to meet the expenses as in other garrison towns. He pointed out that this Association did very considerable work for the Royal Army Medical Corps. It was resolved, on the proposal of Surgeon-General Donovan, that Colonel Wilson's expenses for telegrams, postage and stationery should be defrayed out of the General Relief Fund, and that he should submit his contingent account half yearly to the Secretary for payment, such payments to be confirmed at the following Committee Meeting. It was further resolved that Colonel Wilson's clerks should be given a yearly bonus of £1 each from the General Relief Fund commencing at Christmas, 1911.

(10) An application was read from the Brompton Hospital for the continuance of a yearly subscription of £5 5s. The Secretary was requested to ascertain and report at the next Meeting —

(i) The custom of other Corps.

(ii) Whether it is practicable to send cases direct to the Convalescent Home at Frimley.

(iii) Whether instead of subscribing, the Committee could buy an in-patient letter at any time it was required.

F. W. H. Davie Harris, *Lieutenant-Colonel,*
Secretary.

STATEMENT OF THE ROYAL ARMY MEDICAL CORPS BAND ACCOUNTS.

For the Quarter ending September 30, 1911.

Receipts.	£	s.	d.
Balance Credit brought forward	11	11	2
Officers' Subscriptions (Aldershot)	19	5	0
Secretary R.A.M.C. Fund (Quarterly Grant)	95	0	0
,, ,, ,, (Excursion Grant)	10	0	0
One Officer's Subscription	0	5	0
Petty Cash Account	0	5	0
	£136	6	2

Expenditure.	£	s.	d.
Grant towards Band Excursion	10	0	0
Bandmaster's Salary	30	0	0
Band Pay	54	2	9
Boosey and Co. (new violin cases)	7	13	4
,, ,, (music and repairs)	8	17	6
Hawkes and Son ,, ,,	9	13	2
Altering Tunics	4	18	11
Hawkes and Co. (Bandmaster's clothing)	3	10	0
Stationery	3	3	3
Petty Cash	0	13	0
Postage	0	6	1
Small Repairs	0	5	6
Cheque Book	0	4	2
Recruiting Reward (Serjeant-Bugler Smith)	0	5	0
Fares Advanced	1	0	0
Mallett and Son (Hire of Brakes)	1	10	0
Balance at Bank	0	3	6
	£136	6	2

LEONARD COTTERILL, *Captain*,
Band President, *R.A.M.C.*

Estimate for Quarter ending December 31, 1911.

	£	s.	d.
Balance Credit	0	3	6
Estimated Aldershot Subscriptions	19	0	0
Probable Grant required	95	2	6
	£114	6	0

	£	s.	d.
Estimated expenditure under all heads	114	6	0
	£114	6	0

Audited and found correct.

(*Signed*) J. C. MORGAN, *President*.
G. DELAP, *Major R.A.M.C.*, *Members*.
F. S. IRVINE, ,, ,, ,,

Aldershot, *October* 17, 1911.

ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

The attention of officers of the Corps is invited to the benefits offered by the above Fund, and to the results of the recent quinquennial valuation by the Actuary to the Society.

The benefit provided by the Society to the subscriber's widow, under his marriage subsisting at the date of commencement of his subscription as a married member, is £50 per annum during widowhood, with the continuance of the annuity during re-marriage of the widow or after her death, to the child or children of the said marriage until such child, or the youngest of such children, shall have attained the age of 21 years. Furthermore, should the wife of the subscriber predecease him, it will be optional for him to continue until his death the subscription he had been paying as a married member, in order to provide an annuity similar to the above for the children of the marriage, until the youngest shall have attained the age of 21 years.

In addition to the above benefits, provision is made (Rule X) whereby the surplus at any quinquennial valuation may be applied for the benefit of members, or their widows, or orphan children. Thus, at the recent valuation, as at December 31, 1910, the Actuary reported that "the financial position of the Society continues to be eminently satisfactory," the Valuation Balance Sheet showing a net surplus of £64,822 after providing for annuities, immediate and contingent, to all widows of members. Of this surplus £8,815 was appropriated for division to provide.—

(1) An addition of 4 per cent. to all annuity benefits, immediate or contingent, in respect of members *on the books on December* 31, 1910, which will bring the £50 annuity benefits up to the present statutory limit of £52 per annum.

(2) A sum of £100 to be paid at the death of every first-class married member *on the books at December* 31, 1910, and £50 to the widow of each second-class member *on the books at that date*, should he predecease his present wife, and to be in addition to the sum then payable as the first half-yearly annuity payment.

There is every reason to hope that similar additional benefits may, at the next quinquennial valuation be granted to members now joining.

An important amendment of the Rules was adopted at a Special General Meeting held this year, whereby, to safeguard the interests of existing members, the Committee are empowered, on the imminence or outbreak of war, to postpone consideration of applications for membership, or to charge new members extra rates to cover war risks. A detailed table of rates of subscription will be found at the end of the Rules, of which some examples are given below. Except as above mentioned, these terms cover all war and climate risks, and there are no marriage fines.

There is a class of Unmarried Members who pay £2 a year. They are allowed the equivalent (in terms of Table B in the Rules) of the total of their subscriptions, at compound interest, by way of reduction of their annual subscription when becoming Married Members.

Rules, Actuary's and Annual Reports, Declaration Forms, and other information about the Fund, can be obtained from the Secretary,

Captain J. T. Clapham,
20, Belgrave Road, S.W.

EXAMPLES OF ANNUAL SUBSCRIPTION.

Husband's age	Wife's age	Annual subscription
30	25	£14 18 6
30	30	13 9 10
35	30	16 14 5
40	35	18 17 7

The less the disparity in age the lower the rate of subscription, which is still further reduced in cases where the wife is the elder.

ROYAL ARMY MEDICAL COLLEGE.

LIST OF BOOKS ADDED TO THE LIBRARY DURING THE MONTHS OF JULY, AUGUST AND SEPTEMBER, 1911.

Title of Work and Author	Edition	Date	Source
Japan und Seine Gesundheitspflege. Von Rintaro Mori	..	1911	Surgeon-General Japanese Army
Mitteilungen der Beri-Beri Studien-Kommission	..	1911	,,
The Experimental Chemotherapy of Spirilloses. By Ehrlich and Hata	..	1911	Editor, Journal
The Modern View of Syphilis and its Treatment. By Gustav Baar, M.D.	..	1911	,, ,,
The Dental Directory	..	1911	,, ,,
Riedel's Berichte. Riedel's Reports. 55 Auflage	..	1911	,, ,,
The Reduction of Domestic Mosquitoes. By E. H. Ross	..	1911	,, ,,
A Monograph of the Anopheline Mosquitoes of India. By James and Liston	2nd	1911	,, ,,
The Prevention of Malaria in the Federated Malay States. By M. Watson, M.D.	..	1911	,, ,,
The Errors of Accommodation and Refraction of the Eye. By E. Clarke	3rd	1911	,, ,,
A Report on Hæmoglobinuric Fever in the Canal Zone. A Study of its Etiology and Treatment. By Deeks and James	..	1911	,, ,,
The Medical History of the War in South Africa. An Epidemiological Study. By Lieutenant-Colonel R. J. S. Simpson, C.M.G., R.A.M.C.	..	1911	War Office
Fatigue. By A. Mosso. Translated by M. and W. B. Drummond	..	1906	Library Grant
Modern Methods of Sewage Purification. By G. B. Kershaw	..	1911	,, ,,
A Text-Book of Gynæcological Surgery. By Berkeley and Bonney	..	1911	,, ,,
A System of Medicine. Edited by Allbutt and Rolleston. Vol. ix, "Diseases of the Skin and General Index"	2nd	1911	,, ,,
The Duties of the General Staff. By the late General B. von Schellendorff. Revised by Major B. von Schellendorff	4th	1905	,, ,,
Water-Supply Manual	..	1909	War Office
Handbook of the Medical Services of Foreign Armies. Part 6, "Netherlands and Belgium"	..	1911	,, ,,
Le Corps de Santé Militaire en France son Évolution ses Campagnes, 1708-1882. Par Le Docteur Brice and Le Capitaine Bottet	..	1907	Library Grant
La Direction du Service de Santé en Campagne. Par Medecin Principal 1st Classe Troussaint	..	1911	,, ,,
Smithsonian Meteorological Tables. No. 1032	3rd	1911	,, ,,
Handbook of the Belgian Army	..	1906	War Office
,, ,, Spanish Army	..	1905	,, ,,
,, ,, Italian Army	2nd	1902	,, ,,
,, ,, Austro-Hungarian Army	4th	1909	,, ,,
,, ,, Montenegrin Army	..	1909	,, ,,
,, ,, Roumanian Army	..	1910	,, ,,
,, ,, Servian Army	..	1909	,, ,,
,, ,, Bulgarian Army	..	1909	,, ,,
,, ,, Armies of Sweden and Norway	..	1901	,, ,,

LIST OF BOOKS ADDED TO THE LIBRARY.—*Continued.*

Title and Work of Author	Edition	Date	
Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India—			
No. 45. Epidemic Dropsy in Calcutta. By Major E. D. W. Greig, M.D., I.M.S.	..	1911	Superintendent Government Printing, India
No. 46. Malaria in the Punjab. By Major S. R. Christophers, M.B., I.M.S.	..	1911	
No. 47. Dysentery and Liver Abscess in Bombay. By Major E. D. W. Greig, M.D., I.M.S., and Captain R. T. Wells, M.A., M.B., I.M.S.	..	1911	
United States Department of Agriculture. Office of Experiment Stations—			
Bulletin No. 44. Report of Preliminary Investigations on the Metabolism of Nitrogen and Carbon in the Human Organism. By Atwater, Woods, and Benedict	..	1897	Library Grant
Bulletin No. 89. Experiments on the Effect of Muscular Work upon the Digestibility of Food and the Metabolism of Nitrogen. 1897-1899. By C. E. Wait	..	1901	,, ,,
Bulletin No. 109. Experiments on the Metabolism of Matter and Energy in the Human Body. 1898-1900. By Atwater and Benedict	..	1902	,, ,,
Bulletin No. 121. Experiments on the Metabolism of Nitrogen, Sulphur, and Phosphorus in the Human Organism. By H. C Sherman	..	1902	,, ,,
Bulletin No. 136. Experiments on the Metabolism of Matter and Energy in the Human Body. 1900-1902. By Atwater and Benedict	..	1903	,, ,,
Handbuch der Hygiene. Von Profs. Rubner, Gruber, and Ficker. II Band, 2 Abteilung. "Wasser und Abwasser"	..	1911	,, ,,
An Introduction to Therapeutic Inoculation. By D. W. Carmalt Jones	..	1911	Editor, Journal
Album of Photographs issued by the South Indian Branch of the British Medical Association	..	1911	,, ,,
Annuaire Statistique et Descriptif des Distributions d'Eau de France, Algérie, Tunisie et Colonies Francaises Belgique, Suisse et Grand-Duche de Louxembourg	..	1909	War Office

THE ARMY AND NAVY MALE NURSES' CO-OPERATION.

Patroness: HER MAJESTY QUEEN ALEXANDRA.

President: SIR FREDRICK TREVES, G.C.V.O., C.B.

THE Fourth Annual General Meeting of the Army and Navy Male Nurses' Co-operation was held at 47B, Welbeck Street, London, W., on Monday, July 24, 1911, at 5 p.m., Sir Frederick Treves, Bart., G.C.V.O., C.B., in the chair. After the minutes of the last General Meeting had been read and confirmed, the following Report of the Executive Committee was received: -

REPORT.

The Executive Committee, in presenting their Fourth Annual Report, are pleased to state that the Co-operation has continued its satisfactory progress. The improvement has taken place not only in the increased number of cases nursed, but even more particularly in the receipts for the services of the Nurses, these having amounted to £3,350, showing an increase of nearly £600. This can be in great measure accounted for by the fact that more fully trained nurses have been employed than valet-attendants, whose services command lower fees.

During the past year nearly 350 cases have been nursed, showing an increase of 50 over 1909-10. There have been 42 nurses kept in almost constant employment during this period.

Upwards of 9,000 notices and copies of the Report have been posted to the medical practitioners in the London district and to a large number of those in the Provinces. A special appeal was made for funds to extend the advertisements of the Co-operation, and the proceeds were applied to defraying the cost of inserting a few notices in the daily edition of the *Times*, and a larger advertisement in the Telephone Directory. There is good reason to attribute increased calls on the Co-operation to even this small attempt, and the Executive Committee would be most grateful for any further assistance to effect this object Notwithstanding the large number of notices that are annually distributed the Committee are convinced that the work of the Institution is not so widely known as it should be, and are sure that it is in the direction of more extensive advertisement that the continued development of the Association is to be found. They are confident of full success were the advantages offered more extensively realized.

The Committee desire to specially draw attention to a donation of £30 received from the War Office and a grant of £10 from the profits made in the Canteens of H.M. Transports. Five guineas were also received from the Regimental Institute, Aldershot, and several contributions from various sections of the Royal Army Medical Corps.

At the suggestion of Mr. Rowland Bailey, supported by Sir G. Wyatt Truscott and Dr. Hartley, appeals have been made to various City Companies, with the result that the Mercers generously gave £20.

Since June 30, the close of the financial year, grants of £50 and £10 10s. were made by the Clothworkers and Vintners respectively. (Not specified in the Balance Sheet.)

A sum of £43 18s. 10d. was derived from the profits of a Sale at the Royal Horticultural Hall, in December last, which was organized by the Honorary Secretary.

In conformity with the regulations of the London County Council governing Employment Agencies, a certificate has been granted by the War Office certifying to the nature of the work undertaken by the Co-operation, and that the Institution is properly conducted.

For some time past it has been apparent to the Executive Committee that the separation of the Offices of the Co-operation from the Nurses' Residential Home was unduly costly and increased the work of the Officers. After full consideration the Committee have taken steps to bring both under the same roof, and negotiations are already well advanced to this end. It is contemplated to take the lease of a small house, No. 11A, Welbeck Street, and tenders have been obtained for carrying out the necessary alterations.

The Committee have met ten times during the year, the Selection and Discipline Committee seven times, and the House Committee six times during the same period. Mr. Martin Holland, owing to pressure of work, was compelled to resign his membership, and for the same reason the Chairman, Sir William Allchin, has been compelled to ask to be relieved of his duties, which he has discharged for three years.

Miss Becher, R.R.C., Matron-in-Chief. Q.A.I.M.N.S., has been co-opted a member of the Executive Committee.

The Executive Committee desire to express their very grateful thanks to the Honorary Officers of the Association, Miss McCaul and Fleet-Surgeon Weightman, R.N., the Honorary Secretaries, Dr. Hartley, the Honorary Treasurer, and especially to Mr. Wilkinson, the Honorary Solicitor, and Messrs. James and Edwards, the Honorary Auditors, for their invaluable professional assistance. They also would place on record their high appreciation of the excellent work done for the Co-operation by the Secretary, Miss Biscoe, to whose unremitting attention to the interests of the Co-operation the success of the past year has been in great measure due.

FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE, SECOND BIENNIAL CONGRESS, HONG KONG, JANUARY 20 TO JANUARY 27, 1912.

THE following notice has been received from the Secretary :—

The Second Biennial Congress of this Association will be held in Hong Kong from Saturday, January 20, to Saturday, January 27, 1912, and you are cordially invited to attend and to take part in the work of the Congress. The Association is an international one formed to promote the science and art of Tropical Medicine in the Far East.

Saturday, January 20, will be devoted to the reception of official delegates and visitors, leaving the whole of the following week for the scientific work of the Congress.

The papers offered will be classified, so as to give, as far as possible, a day to each of the following groups of subjects: Protozoology, Helminthology; Cholera, Plague, Leprosy, Tuberculosis, Tropical Fevers including Malaria, Beri-beri, Dysentery; Surgery, Obstetrics, Infantile Diseases; Climate, Hygiene, Sanitation.

Papers may be read in either English, French, or German, but authors are asked to send a brief abstract in English in all cases.

The subscription to the Association is 10s. 6d ($5 Hong Kong currency) and is due now (1911), but no further subscription will be required until 1913

A suitable social programme is being arranged for the entertainment of visitors during the Congress.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

MAJOR H. C. FRENCH, R.A.M C., will deliver two Hunterian Lectures on "Recent Development in the Recognition, Treatment and Prophylaxis of Syphilis," in the Theatre of the College of Surgeons, on Tuesday and Friday, November 7 and 10, 1911, at 5 o'clock each day. Officers interested in the subject are invited to attend

UNITED SERVICES MEDICAL SOCIETY.

THE next meeting of the above-named Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Wednesday, November 8, 1911, at 5 p.m.

Business. Lieutenant-Colonel H. E R. James, C.B., and Major C. E. Pollock, R.A.M.C., "The Evacuation of Sick and Wounded from an Army in the Field, with Special Reference to the Functions of the Clearing Hospital."

J. LAWRENCE SMITH,
Fleet-Surgeon, R.N., Admiralty, S.W.
W. S. HARRISON,
Major, R.A.M.C., Royal Army Medical College, Grosvenor Road, S. W.
Hon. Secretaries.

THE ROYAL SCHOOL FOR DAUGHTERS OF OFFICERS OF THE ARMY, LANDSDOWN, BATH, DECEMBER, 1911.

YOUR votes and interest are solicited on behalf of Shelagh Clare Colpoys Ward, aged 10, daughter of Surgeon-Major E. C. R. Ward, F.R.C.S.I., and the youngest of six children.

Surgeon-Major Ward had sixteen years' service in the Army Medical Staff when he was obliged to retire on account of loss of sight. He became totally blind, and died eighteen months ago. He was through the Zulu, Sekukuni, and Boer Wars, and was present and wounded in the action of Bronkers' Spruit, in the Transvaal, in which action 150 out of the 250 present were killed or wounded, and six out of eight officers lost. Surgeon-Major Ward, with 100 wounded, remained prisoners in the hands of the Boers for three months, and it was to the hardships, privations, and anxieties of this period that the failure of his health was due, which resulted in his loss of sight. The case is recommended by Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., Director-General, Army Medical Service, Surgeon-General Sir William Taylor, K.C.B., M.D., K.H.P., Surgeon-General Sir Alfred Keogh, K.C.B., M.D., Surgeon-General Sir Charles M. D. Cuffe, K.C.B., F.R.C.S., Major-General A. Wilson, C.B., Major-General Sir George A. French, K.C.M.G., Surgeon-General Sir J. A. Woolfryes, K.C.B., C.M.G., K.H.P., Colonel R. A. Kerr Montgomery, D.S.O., R.A.

MARRIAGE.

CRAWFORD—BAKER.—On August 10, at All Saints, Knightsbridge, by the Rev. Prebendary J. H Cardwell, M.A., Captain Maynard Crawford, R.A.M.C., second son of the late Henry Crawford, Celibridge, Ireland, and Mrs. Crawford, Grosvenor Square, Dublin, to Amy, only daughter of Mr. and Mrs. F. Baker, Surbiton.

DEATHS.

HANAFIN.—On September 23, 1911, at 24, Fair Street, Drogheda, Shielah, darling little daughter of Captain and Mrs. P. J. Hanafin.

NICKERSON.—At Singa, Sennar Province, Sudan, on October 13, Captain George Synder Nickerson, M.B., Reserve of Officers, late Royal Army Medical Corps, Governor of the Sennar District, Sudan, aged 38 He entered the Army Medical Corps on July 27, 1898; was seconded for service with the Egyptian Army December 29, 1898; became Captain on July 27, 1901; and retired receiving a gratuity on January 23, 1909; from which date he was appointed by the Sudan Government Governor of the Sennar District. His war service was. Nile Expedition, 1899. Operations resulting in final defeat of Khalifa. Despatches, *London Gazette*, January 30, 1900. Egyptian Medal with two clasps; The Imperial Ottoman Order of the Osmanieh was conferred upon him by H.H. the Khedive of Egypt in 1907, for services rendered with the Egyptian Army

THACKER. At Dublin, on September 24, Major Robert Christy Thacker, Retired pay, late Royal Army Medical Corps, aged 51. He entered the Service as a Surgeon, Medical Staff, on February 5, 1887; became Major, Royal Army Medical Corps, on February 5, 1899; and retired on retired pay on January 26, 1910. His war service was: N W Frontier of India, 1897-8. Operations on the Samana, and at the Ublan Pass. With Tirah Expeditionary Force. Medal with two clasps. South African War, 1899-1902. Operations in Orange River Colony (June, 1900). Operations in Cape Colony, South of Orange River, 1899-1900. Operations in Cape Colony, and Orange River Colony, November 30, 1900, to May 31, 1902. Queen's Medal with two clasps. King's Medal with two clasps.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, 'JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Captain R. H. Bott, I.M.S., Captain W. W. Browne, Captain J. H. P. Graham, Lieutenant-Colonel W. A. Morris, Major S. H. Fairrie, Lieutenant-Colonel M. O'Halloran, Lieutenant-Colonel G. H. Barefoot, Major B. G. Seton, Lieutenant-Colonel P Hehir, Lieutenant-Colonel C. H. Hale, Major F. J. W. Porter, Colonel R. H. Firth, Major H. A. L. Howell, Major C. F. Wanhill, Major A. C. Fox.

The following publications have been received:—

British: Army and Navy Gazette, The Lancet, The Journal of Tropical Medicine and Hygiene, Medical Press and Circular, Sleeping Sickness Bureau, The Hospital, The Indian Medical Journal, The Journal of Meat and Milk Hygiene, Guy's Hospital Gazette, Proceedings of the Royal Society of Medicine, Journal of the Royal United Service Institution, The Australasian Medical Gazette, Red Cross and Ambulance News, The Royal Engineers' Journal, The Army Service Corps Journal, St. Bartholomew's Hospital Gazette.

Foreign: American Medicine, Archiv. für Schiffs- und Tropen-Hygiene, Revista di Sanidad Militar, Bulletin de l'Institut Pasteur, Annali di Medicina Navale e Coloniale, Office International D'Hygiene Publique, Le Caducée, Bulletin of the Johns Hopkins Hospital, Japanese Medical Journal, Deutsche Militärärztliche Zeitschrift, Archives de Médecine et Pharmacie Navales.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

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JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

December, 1911.

ARMY MEDICAL SERVICE.

The undermentioned Colonels are placed on retired pay .—

Herbert J. R. Moberly, dated October 26, 1911.

Robert H. Forman, M.B., dated November 2, 1911.

Colonel Moberly entered the service as a Surgeon, Army Medical Department, on February 5, 1881; became Surgeon-Major, Army Medical Staff, February 5, 1893; Lieutenant-Colonel, Royal Army Medical Corps, February 5. 1901; Lieutenant-Colonel with increased pay June 11, 1904, and Colonel, July 1, 1909. His war service is. South African War, 1899-1902; Advance on Kimberley, including actions at Belmont, Enslin, Modder River and Magersfontein. Operations in the Orange Free State, February to May, 1900, including actions at Poplar Grove, Dreifontein, Vet River, and Zand River. Operations in the Transvaal in May and June, 1900, including actions near Johannesburg, Pretoria, and Diamond Hill. Operations in Natal, 1900. Operations in the Transvaal, east of Pretoria, July to November 29, 1900, including action at Belfast. Operations in the Transvaal, December, 1901. Operations in Orange River Colony, December, 1901, to May 31, 1902. Operations in Cape Colony, November 30, 1900, to February, 1901. Despatches *London Gazette*, July 29, 1902. Queen's medal with six clasps. King's medal with two clasps.

Colonel Forman entered the service as a Surgeon, Army Medical Department, on March 6, 1880; became Surgeon-Major, Army Medical Staff, March 6, 1892; Lieutenant-Colonel Royal Army Medical Corps, March 6, 1900; Lieutenant-Colonel with increased pay, May 23, 1902, and Colonel, January 8, 1906. He was appointed Honorary Surgeon to H.E. the Viceroy of India, January 1, 1910.

The undermentioned Lieutenant-Colonels from the Royal Army Medical Corps, to be Colonels: Henry O. Trevor, *vice* H. J. R. Moberly, dated October 26, 1911. Alexander F. Russell, C.M.G., M.B., *vice* R. H. Forman, M.B., dated November 2, 1911.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Thomas W. O'H. Hamilton, C.M.G., M.B., retires on retired pay, dated November 4, 1911. Lieutenant-Colonel Hamilton entered the service as a Surgeon, Army Medical Department, on February 3, 1883; became Surgeon-Major Army Medical Staff, February 3, 1895: Lieutenant-Colonel, Royal Army Medical Corps. February 3, 1903, and Lieutenant-Colonel with increased pay, November 4, 1908. His war service is: South African War, 1899-1902. Relief of Kimberley. Operations in Orange Free State, February to May, 1900, including operations at Paardeberg (February 17 to 26), actions at Poplar Grove, Dreifontein and Zand River. Operations in the Transvaal, in May and June, 1900, including actions near Johannesburg, Pretoria and Diamond Hill (June 11 and 12). Operations in the Transvaal, east of

Pretoria, July to November 29, 1900, including actions at Belfast (August 26 and 27). Operations in Cape Colony, south of Orange River, 1899-1900, including actions at Colesberg (January 14 to February 3). Despatches, *London Gazette*, April 16, 1901. Queen's medal with six clasps. King's medal with two clasps. C.M.G.

The undermentioned Majors to be Lieutenant-Colonels: Charles R. Elliott, M.D., *vice* H. O. Trevor, dated October 26, 1911. Charles A. Young, *vice* A. F. Russell, C.M.G., M.B.; John W. Bullen, M.D., *vice* C. A. Young, supernumerary; Benjamin J. Inniss, *vice* J. Will, supernumerary; dated November 2, 1911.

Major Albert Pearse retires on retired pay, dated November 15, 1911. Major Pearse entered the service as a Surgeon, Army Medical Staff, on January 31, 1891, and became Major, Royal Army Medical Corps, in January, 1903. His war service is: North-West Frontier of India, 1897-1898. Mohmand. Medal with clasp. South African War, 1899-1900. Employed with Hospital Ship "Princess of Wales," Operations in Orange River Colony, May to November, 1900. Operations in Cape Colony south of Orange River, 1899-1900. Despatches *London Gazette*, June 17, 1902. Queen's medal with two clasps.

Major Gerald B. Carter, M.B., retires, receiving a gratuity, dated November 8, 1911. Major Carter entered the service as a Surgeon-Lieutenant, Army Medical Staff, on January 28, 1898; became Captain, Royal Army Medical Corps on January 28, 1901, and Major on October 28, 1909.

The undermentioned Captains to be Majors, dated October 25, 1911: Thomas E. Fielding, M.B., Charles H. Straton; James M. Cuthbert, M.B.; Robert T. Brown, M.D.

Captain Herbert O. M. Beadnell is placed temporarily on the half-pay list on account of ill-health, dated October 17, 1911.

Captain Alexander D. Fraser, M.B., from the seconded list, is restored to the establishment, dated October 24, 1911.

Lieutenant Benjamin Biggar, M.B., from the seconded list, is restored to the establishment, dated October 1, 1911.

HIGHER RATE OF PAY.—Lieutenant-Colonels R. L. R. Macleod, G. G. Adams. J. M. F. Shine and N. C. Ferguson, C.M.G. have been selected for the higher rate of pay under Article 317, Royal Warrant.

ARRIVALS HOME FOR DUTY.—From India, on November 1. Lieutenant-Colonels W. C. Beevor, C.M.G., T. McCulloch, and Captain J W. S Seccombe.

ARRIVALS HOME ON LEAVE. Majors M. P. Corkery and H K. Palmer; Captains J. Powell, H. C. Sidgwick, and R. G. Archibald.

POSTINGS.—Lieutenant-Colonel W. C. Beevor, C.M.G., to Fermoy. Lieutenant-Colonel H. C. Thurston, C.M.G., to Aldershot temporarily (for Royal Military College on January 1). Lieutenant-Colonel T. McCulloch, to Netley. Captain J. W. S Seccombe, to Royal Army Medical College.

TRANSFERS.—Lieutenant-Colonel B. J. Inniss, from the Eastern Command to the Irish Command. Major M. Boyle, from the Northern Command to Jersey. Major St. J. B. Killery, from Jersey to the Northern Command Major L. N. LLoyd, D.S O., London District to the Western Command. Captain C. D. Myles, from the Southern Command to the Western Command. Captain J. E. Powell, from the Northern Command to Alderney.

APPOINTMENTS — Lieutenant-Colonel F. H. M. Burton, Charge of the Military Hospital, Warley. Lieutenant-Colonel W C Beevor, C M G., Charge of the Military Hospital, Fermoy. Lieutenant-Colonel T McCulloch, Charge of the Medical Division, Royal Victoria Hospital, Netley Lieutenant-Colonel B. J. Inniss, Charge of the Military Hospital, Belfast. Major G. W. Tate, Medical Inspector of Recruits, Irish Command. Captain S M. W. Meadows, Charge of the Military Families' Hospital, Tidworth Captain S. E. Lewis, Charge of the Military Families' Hospital, Devonport.

QUALIFICATIONS.—The undermentioned officers have obtained the degrees, &c., noted against their names. Major D. Harvey, M D, University of Glasgow. Captain T. S. Dudding, Diploma in Public Health, University of Cambridge. Lieutenant W. P. MacArthur, M.R.C.P.I.

EMBARKATIONS.—*For South Africa.*—On October 19, Lieutenant-Colonel M. J. Sexton; Captain C. E. Fleming, and Lieutenant O. W. McSheehy. On October 21, Lieutenant H. F. Joynt.

For Mauritius.—On October 19, Captains A. F. Carlyon and F. M. Parry; Lieutenant W. P. MacArthur.

For India.—On November 10, Lieutenant-Colonel E. A. Burnside; Majors R. H. Lloyd and J. M. Sloan, D.S.O.; Captain F. W. W. Dawson.

DISTRIBUTION OF OFFICERS TO COMMANDS IN INDIA.

The following alterations in the distribution of officers of the Royal Army Medical Corps proceeding to India during the trooping season 1911-12, have been notified by Army Headquarters, India.

Northern Army.—2nd (Rawal Pindi) Division: Lieutenant Colonel J. Donaldson. Major L. Way, Lieutenant F. W. M Cunningham, instead of 3rd Division 3rd (Lahore) Division: Lieutenant-Colonel W. L. Gray. 8th (Lucknow) Division: Captain C. S. Smith, Lieutenant P. S. Tomlinson, instead of 7th Division.

Southern Army.—4th (Quetta) Division: Lieutenant R. C. Priest, instead of 5th Division. 5th (Mhow) Division. Captain R. F. M. Fawcett, instead of 9th Division. 6th (Poona) Division. Captain H. A. Bransbury, instead of 9th Division. 9th (Secunderabad) Division: Lieutenant-Colonel E. A. Burnside, Major L. P. More, instead of 5th Division.

SERVICE ABROAD.

With reference to the memorandum published in the Corps News for July, Captain J. Tobin will now proceed to Gibraltar, instead of to the Southern Army, India, as therein stated.

RESULTS OF EXAMINATIONS.

The following results of examinations are notified for general information;—

Passed in (b) for promotion to the higher ranks: Captains H. G. Sherren, J. A. Bennett.

Passed for promotion to the rank of Captain in (b): R. C. M. G. Kinkead, A. R. Wright, A. W. Byrne.

NOTES FROM THE LONDON DISTRICT.—

FAREWELL DINNER TO COLONEL SIR DAVID BRUCE, C.B., F.R.S.

On Wednesday, October 25, Colonel Risk and the members of the Royal Army Medical Corps Mess, London, gave a farewell dinner to Colonel Sir David Bruce, C B., F.R.S., who was leaving for Nyasaland on November 9 as President of a Commission, inaugurated by the Royal Society, for the further Investigation of Sleeping Sickness. In addition to Sir David Bruce, three members of the Royal Army Medical Corps are serving on this Commission, Major D. Harvey, Captain A. E. Hamerton, D.S.O., and Staff-Serjeant A. Gibbons. Lady Bruce is also accompanying the expedition.

Ninety-one officers and guests were present, and among the guests were Surgeon-General Sir Alfred Keogh, Surgeon-General A. M. Branfoot, Sir John Rose Bradford and Dr. Louis C. Parkes.

The Director-General proposed the health of Sir David Bruce in felicitous terms; he also included the name of Lady Bruce, paying a tribute to their splendid work in the cause of science during the past twenty years.

Colonel Bruce replied, and gave an interesting sketch of the objects of the Commission. He said, "For years we have been prophesying that sleeping sickness would never spread beyond about 10° of south latitude, since the tsetse fly (*Glossina palpalis*) is not found south of this line. But, alas! for the prophets, sleeping sickness has broken out in North-east Rhodesia, and in Nyasaland, where there are no *G. palpalis*, but many of another tsetse fly, the *G. morsitans*. Now our first duty on arriving in Nyasaland will be to discover how the infection is conveyed in these cases. If by *G. morsitans*, then we may dread a further extension of the disease down as far south as the Transvaal and Zululand. Another important point to make out will be the true nature of this disease. Is it the ordinary sleeping sickness spread from the Congo? Or is it a form of trypanosome disease which is indigenous to the country, and which has simply escaped notice up to the present? If it is true sleeping sickness, why has the *Trypanosoma gambiense* changed into a new species, the *T. rhodesiense*?

"Another chief object of the Commission will be to find out what connection, if any, exists between the wild game and trypanosome disease of man and animals. There has been a great deal of discontent among the settlers on account of the number of wild animals and tsetse flies about, and they think, rightly or wrongly, that if the wild animals were less numerous the tsetse flies would also disappear. On the results of our work, then, the drawing up of future Game Preservation Acts may to some extent depend. To do this work a stationary camp with laboratory and dwelling huts for the Commission will be necessary. The site of this camp is important; it should be in a healthy situation, and not exposed at any time of the year to the presence of tsetse fly. The camp should also be within easy reach of sleeping sickness cases, tsetse flies, and wild game. For example, in Zululand, my laboratory was placed on the top of the Ubombo mountain, some 1,500 ft. above the surrounding country. At the foot of the hill, within two hours' walk, tsetse fly swarmed; and there was also a large number of animals, such as buffalo, wildebeeste, koodoo, &c. I have just received a letter from Captain Hamerton saying that a site for a camp has been fixed upon. It is on a low hill, called Kasu Hill, in Angonaland. It is about 200 miles north of Zomba, the seat of Government in Nyasaland, and 25 miles west of the lake. The low country round about swarms with tsetse flies and wild animals, and the sleeping sickness cases are within easy distance.

"Some people think that this sort of work is not the function of the Royal Army Medical Corps. Our work is regarded as consisting only of the treatment of the sick soldier; I do not agree with them. In our Service there is room for the scientific investigator as well as for the clinician.

"I have always wished that our Service would develop into a Scientific Corps on the lines of the Royal Engineers. When any scientific engineering work is proposed in any part of our Empire, an engineer officer is often entrusted with it. So, in the same way, if any investigation or research work in preventive medicine is wanted in any part of the British Empire, I should like our Corps to be applied to for men to carry it out.

"We must remember that our chief function as army doctors should be prevention, not treatment. For myself, I have little patience with a policy that waits until a man is ill before helping him. Think what Parkes, the greatest scientist we have ever had, has done for the soldier. Look what we have already achieved in preventive work. In India, enteric fever has been almost extinguished in consequence of scientific research. Think of the brilliant result of the Commission on Malta fever, composed mainly of Service officers, which at a blow blotted out some 70,000 days per annum of severe illness in that island. Another Commission, also composed of our officers, had by research so learnt the distribution and mode of spread of sleeping sickness in Uganda, that the administration could stamp out the disease in that country and at almost no expense. Sir Apolo Kagwa, the Prime Minister, has just written saying he thinks that no fresh cases are occurring in that country. It is true that this has been done by sacrificing some of the most fertile land in Uganda, and allowing it to lapse into jungle. But it is to be hoped that in a short time the old sleeping-sickness areas will be purged and become healthy again, and so allow the people to return to their old homes.

"From what I have said it is evident that the Commission will have plenty of research work to carry out in Nyasaland.

"I am much gratified by the flattering expressions which have fallen from the lips of the Director-General, and the kind way in which you have received the toast of my health."

NOTES FROM BLOEMFONTEIN.—Major H. B. Fawcus writes: "A very successful athletic sports meeting was held here on October 12. The following account is taken from the *Bloemfontein Post* of October 13:—

"'The Annual Sports Meeting of the No. 24 Company of the Royal Army Medical Corps was held at Tempe yesterday afternoon. The boisterous weather of the morning aroused fears that the eagerly awaited event would be robbed of much of its enjoyment through unfavourable conditions, but except for a slight dust storm there were no adverse influences and the sports were in every way a great success.

"'The precision and smoothness with which the varied items of the programme were carried out reflected the highest credit upon all concerned.

"'Major H. B. Fawcus, Captain J. A. Anderson, Captain and Quartermaster Clapshaw, Lieutenant Pollard, Serjeant-Major Barnard, Quartermaster-Serjeant Allwork, Serjeant Girling, Staff-Serjeant Brewer, Serjeant Coupland, Serjeant Harman, Corporal Mayo, Private Wright, and Private Cheney, all strove in various ways to ensure the success of the sports. The Engineers, the Army Service Corps, and the Ordnance Corps, also rendered valuable service.

"'By the kind permission of Major J. H. A. Annesley and officers, the fine band of the Carabiniers, under Bandmaster Simpson, went through an excellent programme, commencing with the Royal Army Medical Corps regimental march.

"'Privates Gardiner and Kilby as clowns, and Private King, made up as a female, added an element of fun to the sports.

"'In the absence of Lieutenant-Colonel R. G. Hanley, Major J. Poe presided over the proceedings. The general invitation extended to the Garrison was well responded to. Many convalescents from the hospital were also noticeable.

"'Below are the results of the events:—

"'Throwing the Cricket-ball: Private Rouse, 1; Private Hamilton, 2. Private Rouse threw 92 yds., which is 2 yds. less than the garrison record.

"'Kicking the Football (place kick): Private Brewer, 1; Serjeant Harvey, 2.

"'High Jump: Private Rouse won with 4 ft. 7 in.

"'220 Yards Handicap: Private Davidson, 1; Serjeant Bell, 2; Private Rouse, 3.

"'Quarter Mile (open to Garrison): Serjeant Drummer Chandler (Wilts), 1; Lance-Corporal Taylor, 2.

"'Thread and Needle Race: Mrs. Girling, 1; Miss Bamford, 2.

"'Tug-of-War: Won by No. 3 Section.

"'Potato Race: Miss Layzel, 1; Mrs. Higginbottom, 2.

"'Band Race: Trumpet-Major Stevenson, 1; Bandsman Golding, 2; dead heat between Bandsmen Farquhar and Howard for the third place.

"'Consolation Race: Private Herd, 1; Private Phillips, 2; Private Williamson, 3.

"'Relay Race. Won by No. 3 Section.

"'Sack Race: Private Brewer (W.), 1; Private Barsby, 2; Private Gill, 3.

"'Half Mile (open to Garrison): Serjeant-Trumpeter Chandler (Wilts), 1; Private Howard (D.C.L.I.), 2.

"'Children's Race: Fred Barnard, 1; Edward Clapshaw, 2; Fred Granger, 3.

"'100 Yards Handicap: Private Davidson, 1; Serjeant Bell, 2; Private Green, 3. Private Davidson also won the gold medal presented by Messrs. Irvine and Johnson for this event.

"'Long Jump: Serjeant Bell (16 ft. 6 in.), 1; Private Hawkes (15 ft. 6 in.), 2.

"'Veterans' Race: Serjeant Girling, 1; Quartermaster-Serjeant Bennett, 2; Serjeant Higginbottom, 3.

"'Obstacle Race: Private Termersuizen, 1; Private Hawkes, 2; Private Barsby, 3.

"'Half Mile Scratch: Private Green, 1; Private Sherman, 2; Private Barsby, 3.

"'In addition to these items, a fine display of gymnastics—horizontal and parallel bars and vaulting—was given by representatives of the D.C.L.I. and Cameronian regiments, conducted by Serjeant-Major McDonald. Another event which added variety to the programme and aroused some interest was a whippet race.

"'The prizes were presented by Mrs. Lambkin.'"

NOTES FROM JAMAICA.—Serjeant-Major F. C. Cross, writes: "Captain H. C. Sidgwick has gone on leave to England on completion of tour, and his departure is a source of regret to all with whom he came in contact.

"Our Senior Medical Officer, Colonel Trevor, and Major F. G. Richards, lately promoted, proceed home this season, after three years service on the station.

"The home-going draft this season will probably be very small, as Staff Serjeant Smith, Corporal Russell, and Private Weight have applied for, and obtained, permission to remain on the island one more year, thus reducing the English contingent to two N.C.Os. and one man.

"None of the Company would be surprised to see some of them return next season, as Jamaica acts as a powerful magnet to those who have once served on the isle.

"Military cricket out here this season has received an impetus by the addition of Captain S. Field, R.A.M.C., who, playing either for the Garrison Team or the Camp United C.C., amassed no less than 905 runs, and was responsible for the downfall of 87 wickets.

"The cricket season has only just come to a close, but already a scheme is afoot to form a new Company Cricket League, composed of the four West India Regiment Companies, 66 Company, Royal Garrison Artillery, 44 Company, Royal Engineers, and 29 Company, Royal Army Medical Corps, and though the last named company is far and away the smallest numerically, we are looking forward to the contest with feelings of keen, and it is to be hoped not unfounded, optimism.

"Once again the football season has commenced its short annual existence, and out of the six teams engaged in the senior competition, four are supplied by the military element, so that again there is every possibility of the Jamaica Shield finding a resting place under martial care.

"Under the impression that they are themselves capable of winning the shield, the Royal Engineers have seceded from the mother team, and though weakened by this the Departmentals hope to retain the shield at Up Park Camp

"If last year's champions have been rendered less powerful by the action of the Engineers, the Royal Garrison Artillery, have also reduced their chances of becoming the season's victors; for, whereas in 1910 they ran one strong team, this time they are putting two combinations in the field, hoping by this means to transfer the venue of the trophy from Camp to Port Royal.

"At the moment of writing news comes to hand that the "Departs," playing the Royal Garrison Artillery "B" team on the garrison ground at Port Royal, effected a draw, and it is confidently asserted by supporters of the former team, that, had not the referee made a glaring blunder in regard to an offside goal, the Royal Artillery would have suffered defeat.

"The hill season has just come to a close, and those European troops who spent the summer at Newcastle have returned hale and hearty, thanks to the invigorating effects of the keen Blue-Mountain air.

"The 29 Company is at the present time afflicted with an epidemic of study, for nearly every man is either attending school, studying dispensing, or reading up for some examination whose ultimate end is promotion."

NOTES FROM MAURITIUS.—Serjeant-Major F. Higdon: "I am sure there are many in the Corps who will be pleased to read an account of the wedding of No. 12965 Serjeant H. E. Tylor and Miss K. M. Brush, of Curepipe, which took place at St. Clement's Church, Curepipe, on September 21.

"The church, which was very tastefully decorated, was crowded, the various uniforms of the different Corps present lending quite a blaze of colour to the occasion, every Corps in the Garrison being well represented.

"The service, which was fully choral, was well rendered by a large military choir, conducted by Lance-Corporal George, R.A.M.C.; the officiating clergymen were the Rev. F. J. P. Jellicoe, Chaplain to the Forces, and the Rev. S. A. D'Avray, of St. Clement's. The bride was given away by Mr. J. Thompson, Serjeant M. Ward, R.A.M.C., acting as best man.

"The bride and bridegroom left the church to the strains of Mendelssohn's Wedding March, passing under an arch of swords to the motor which conveyed them to the Town Hall, Curepipe, where the reception was held, and about 120 guests sat down to a breakfast supplied by the "Flore Mauricienne" that left nothing to be desired. After the usual toasts had been proposed and acknowledged, the spacious ballroom provided recreation for lovers of the terpsichorean art, excellent music being provided by a part of the band of the 3rd Royal Fusiliers.

"Among the presents, which were both useful and ornamental, were:—

"From the bride's Mother, silver cutlery; Mrs. H. S. Rolfe silver cake stand; Lieutenant-Colonel W. L. Reade, R.A.M.C., silver flower vase; W. O. and senior N.C.Os., R.A.M.C., set of fish carvers; Corporals, R.A.M.C., silver inkstand; Garrison Serjeants Mess, bronze and marble clock; Staff-Serjeants Knott, R.E., and Dukes, R.E., silver butter dish; Serjeant Robinson, R.E., set of silver spoons; Staff-Serjeant Harold, A.S.C., silver jam dish; and a large number from civilian and other military friends."

NOTES FROM SIMLA—Colonel R. S. F. Henderson, K.H.P., R.A.M.C., Secretary to the Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated October 19, 1911:—

"*Appointments.*—Colonel W. W. Pike, British Service, has been appointed Principal Medical Officer, Bombay Brigade, *vice* Colonel R. H. Forman, V.H.S., British Service, retiring.

"Colonel H. J. Barratt, British Service, has been appointed Principal Medical Officer, Allahabad and Fyzabad Brigades, *vice* Colonel L. E. Anderson, British Service, transferred.

"Captain R. G. H. Tate, R.A.M.C., has been appointed Sanitary Officer, 3rd (Lahore) Division.

"*Leave.*—The grant of leave to the undermentioned officers has been concurred in:—

"Lieutenant-Colonel F. J. Morgan, R.A.M.C., for six and a half months, from March, 1912.

"Captain W. Egan, R.A.M.C., for eight months, from February, 1912.

"*Specialists.*—Captain W. R. Galwey, R.A.M.C., has been appointed to the charge of the Brigade Laboratory at Ambala.

Transfers.—Captain A. H. Jacob, R.A.M.C., has been transferred from the 2nd (Rawalpindi) to the 3rd (Lahore) Division for duty, and Captain D. B. McGrigor, R.A.M.C., from the 4th (Quetta) to the 7th (Meerut) Division.

"*Trooping.*—The undermentioned officers have been detailed for duty on the homeward voyage of the transports named: Lieutenant-Colonel F. J. Morgan, H.T. 'Plassy,' leaving Bombay March 13, 1912. Captain W. Egan, H.T. 'Rewa,' leaving Karachi February 14, 1912."

PROMOTIONS.

The following promotions, to complete Establishment, will take effect from the dates specified :—

To be Serjeant-Majors.

No.	Rank and Name		Date	Section	Remarks
10295	Qmr.-Serjt.	Strong, C. J. ..	19.7.11	..	*Vice* C. H. Cooper, to H.M. Commission.
10162	,, ,,	Drury, C. ..	29.7.11	..	,, W. Carey, to pension.
9053	,, ,,	Filmer, F. J. ..	5.8.11	..	,, H. J. Dudman, to pension.
10015	,, ,,	Grant, A. W. ..	18.8.11	..	,, J. F. E. Godman, to pension.
8991	,, ..	Cox, R. ..	13.9.11	..	,, C. A. Kay, to pension.

To be Quartermaster-Serjeants.

No.	Rank and Name		Date	Section	Remarks
10206	S.-Serjt. ..	Enwright, J. ..	19.7.11	..	*Vice* C. J. Strong promoted.
11051	,, ,,	Williams, H. ..	26.7 11	..	,, W. H. Akehurst, to pension.
12960	,, ,,	Willsher, J. W.	29 7.11	..	,, C. Drury, promoted.
12668	,, ,,	Sellex, G. ..	29.7.11	..	,, J. W. Willsher, Supernumerary at War Office.
10699	,, ,,	Connolly, B. D.	5.8 11	..	,, F. J. Filmer, promoted.
12386	,, ,,	Purchase, E. ..	18.8.11	..	,, A. W. Grant, promoted.
11862	,, ,,	Rose, H. W. ..	13.9.11	..	,, R. Cox, promoted.

To be Staff-Serjeants.

No.	Rank and Name		Date	Section	Remarks
10820	Serjeant ..	Pearson, J. ..	19.7.11	..	*Vice* J. Enwright, promoted.
14503	,, ..	Pottinger, G. ..	26.7.11	..	,, H. Williams, promoted.
12504	,, ..	Shepherd, E. ..	29.7.11	..	,, G. Sellex, promoted.
14602	,, ..	Hughes, J. ..	29.7.11	..	,, E. Shepherd, Supernumerary with Egyptian Army.
12510	,, ..	Redwood, F. J.	5.8.11	..	,, B. D. Conolly, promoted.
13027	,, ..	Cantrell, J. B...	18.8.11	..	,, E. Purchase, promoted.
11116	,, ..	Thomas, G. E.	13.9.11	..	,, H. W. Rose, promoted.

To be Serjeants.

No.	Rank and Name		Date	Section	Remarks
12242	Lce.-Serjt.	Luxton, A. J. ..	19.7 11	Nursing ..	*Vice* J. Pearson, promoted.
13921	,, ..	Cooper, J. W. ..	26.7.11	General Duty	,, G. Pottinger, promoted.
15783	,, ..	Lloyd, E. F. H.	28.7.11	,, ,,	,, E. Bowen, to Territoral Forces.
15848	,, ..	Garbett-Burbridge, A. E.	29.7.11	Nursing ..	,, J. Hughes, promoted.
12302	,, ..	Whyte, W. ..	1.8.11	,, ..	,, E. J. Gibson, discharged.
12411	,, ..	Sims, A. A. ..	5.8.11	Q.A.I.M.N.S.	,, F. J. Redwood, promoted.
12651	,, ..	Bennett, R. H.	9.8.11	Nursing ..	,, E. J. Webberley, to Territorial Forces.
14356	,, ..	Vyse, W. L. ..	18.8.11	General Duty	,, J. B. Cantrell, promoted.
16002	Corporal ..	Amsden, H. W.	6.9.11	,, ,,	,, J. W. Parsons, to pension.
14209	,, ..	McCune, A. ..	12.9.11	Nursing ..	,, T. Dent, to pension.
16190	,, ..	Cowling, J. R.	13.9.11	,, ..	,, G. E. Thomas, promoted.

To be Corporals.

10555	Lce.-Corpl	Holden, W. C.	1.10 11	General Duty	To complete Establishment.
19543	,, ..	Audus, F. E. H.		Nursing ..	
11532	,, ..	Callander, A. ..		General Duty	
18417	,, ..	Knight, J. ..		,, ,,	
16979	,, ..	Egan, R. V. V.		Nursing ..	
17894	,, ..	Syrett, G. R. ..		Cooking ..	
18243	,, ..	Vincent, W. ..		,, ..	
18506	,, ..	Cray, R. W. ..		General Duty	
18507	,, ..	Gerrie, W. A. ..		Clerical ..	
18509	,, ..	McFarland, J...		Nursing ..	
18518	,, ..	Darlington, J.W.		,, ..	
18524	,, ..	Smitherman, T. H.		Clerical ..	
18530	,, ..	Murphy, A. ..		,, ..	
18545	,, ..	Douglas, J. ..		Q.A.I.M.N.S.	
18571	,, ..	Pepper, F. T. ..		Clerical ..	
18559	,, ..	Rodgers, G. F.		General Duty	
18621	,, ..	Walton, A. J. ..		Nursing ..	
18906	,, ..	Whyatt, T. G...		Clerical ..	
19563	,, ..	Harrington, H.		General Duty	
10044	,, ..	Hickman, C. W.		,, ,,	

APPOINTMENTS.

The following appointments, to complete Establishment, will take effect from the dates specified:—

To be Lance-Serjeants.

No.	Rank and Name		Date	Section	Remarks
15967	Corporal ..	Tringham, W.T.	1.10.11	Clerical ..	Special as Clerk To complete Establishment.
9609	,, ..	Chipperfield, J.A.		Cooking ..	Special as Superintending Cook
13469	,, ..	Rogers, F. ..		General Duty	
16110	,, ..	Wellham, J. ..		Nursing ..	As Dispensers
16130	,, ..	Lacey, W. ..		Cooking ..	
16247	,, .	Freeman, E. S.		General Duty	
16325	,, ..	Gibbs, A. F. ..		Nursing ..	
16446	..	Whitehead, W.		General Duty	

To be Lance-Corporals.

No.	Rank and Name		Date	Section	Remarks
14961	Private ..	Monk, A. ..	1 10 11	Nursing ..	To complete Establishment
19119	,, ..	Bennett, W. E.		,, ..	
17839	,, ..	Watkins, A. ..		,, ..	
18137	,, ..	Jones, J. W. ..		,, ..	
18727	,, ..	Lewis, T. M. ..		,, ..	
18982	,, ..	Newman, A. ..		,, ..	
19109	,, ..	Pout, H. W. ..		Superintending Cook	
19133	,, ..	Dewhurst, J. C.		1st Class Clerk	
19150	,, ..	Messenger, T. H.		Nursing ..	
19175	,, ..	Stow, F. E. ..		Q.A.I.M.N.S.	
19259	,, ..	Burrows, A. W.		Nursing ..	
19261	,, .	Croft, A. T. ..		General Duty	
19267	,, ..	Peacock, J. ..		Clerical ..	
19272	,, .	Lee, W. J. ..		Nursing ..	
19279	,, ..	Mars, H. E. ..		1st Class Clerk	
19280	,, ..	Clarke, E. ..		General Duty	
19291	,, ..	Lauraine, G. ..		,, ,,	
19298	,, ..	Mills, F. J. ..		Clerical ..	
19303	,, ..	Green, R. T. ..		Superintending Cook	
19347	,, ..	White, A. J. ..		Superintending Cook	
19350	,, ..	Barnes, C. J. W.		General Duty	
19354	,, ..	Sanders, H. ..		Superintending Cook	
19370	,, ..	Potter, T. H. ..		Nursing ..	
19386	,, ..	Game, H. E. ..		Superintend-Cook	
19385	,, ..	Johnson, H. ..		1st Class Clerk	
19387	,, ..	Oldridge, C. W.		General Duty	

AWARD OF ARMY FORM C. 344.

The undermentioned have been awarded A.F. C 344, on completion of three years training, on the dates specified :—

No.	Rank and Name		Date	No.	Rank and Name		Date
19721	Private..	Walsh, C. F.	22.9.10	19709	Private..	Young, W. E.	10.6.11
19747	Lce.-Cpl.	Hyde, C. H...	13.10.10	1716	,, ..	Duncombe, F. G H.	30.6.11
1141	Private..	Dyson, H A.	26.4.11	1848	,, ..	Martins, A. V.	30.6.11
1475	,, ..	Bamford.W.J.	26.4.11	19744	,, ..	Simmons, R. W.	30.6.11
19698	,, ..	Wass, M. ..	17.5.11	1617	,, ..	Eaton, C. ..	30.6.11
19080	Lce.-Cpl.	Mann, R. S...	2.6.11	16165	Serjt. ..	Bullough. P..	22.9.11
1386	Private..	Dovey, C. ..	2.6.11				
19822	,, ..	Mundy, A. ..	10.6.11				

NURSING SECTION.

The following appointments to the Nursing Section of the Corps will take effect from the dates specified :—

No.	Rank and Name		Date	No.	Rank and Name		Date
4870	Pte. ..	Poules, S. ..	15.7.11	18576	Serjt...	Lamkin, W. ..	28.8.11
5128	,, ..	Dean, P. ..	15.7.11	15698	Crpl...	Collier, H. C. F.	28.8.11
5127	,, ..	Manns, W. J...	25.7.11	5144	Pte. ..	Smith, A. ..	30.8.11
5266	,, ..	Toghill, F. ..	1.8.11	5241	,, ..	Hollier, F. C. ..	30.8.11
5074	,, ..	Lawson, P. L...	5.8.11	934	,, ..	Giles, T. ..	4.9.11
5200	,, ..	Breeze, J. H. ..	5.8.11	4813	,, ..	Humphrey, S.R.	5.9.11
5232	,, ..	Drury, S. T. ..	5.8.11	5104	,, ..	Steer, H. J. ..	6.9.11
4836	,, ..	Douglas, G. ..	8.8.11	5214	,, ..	Stanford, E. R.	6.9.11
4389	,, ..	Dodow, P. F. ..	12.8.11	5215	,, ..	Herbert, W. A.	6.9.11
4524	,, ..	Crosby, P. ..	12.8.11	5133	,, ..	Russell, C. L. ..	12.9.11
5136	,, ..	Holness, T. ..	15.8.11	4471	,, ..	Clarke, R. ..	21.9.11
15484	Srjt. ..	Jones, C. ..	21.8.11	5205	,, ..	Penson, H. G...	21.9.11
15591*	,, ..	Harris, J. ..	21.8.11	5244	,, ..	Hourston, E.W.	21.9.11
18655	Crpl...	Shepley, F. ..	21.8.11	5180	,, ..	Jones, W. J. ..	22.9.11
1620	L.-Crpl.	Pegg, A. E. ..	21.8.11	5327	,, ..	White, L. ..	22.9.11
5567	Pte. ..	Gilmour, T. ..	21.8.11	5392	,, ..	Moyse, R. .	22.9.11
5018	,, ..	Cook, W. C. ..	22.8.11	5296	,, ..	Howard, A. O...	26.9.11
5274	,, ..	Botcherby, R...	22.8.11	5318	,, ..	Turner, M. ..	26.9.11
5282	,, ..	Hurlock, H. E.	22.8.11	5321	,, ..	Graham, W. ..	26.9.11
5316	,, ..	Wall, W. G. H.	22.8.11	2294	,, ..	Sygrave, G. ..	29.9.11
5006	,, ..	Cronley, A. C...	24.8.11	5034	,, ..	Taprill, F. ..	29.9.11
5146	,, ..	Merrill, T. ..	24.8.11	5068	,, ..	Moseley, J.B.M.	29.9.11
5195	,, ..	Savage, A. ..	24.8.11	5184	,, ..	Rolls, J. A. ..	29.9.11
4372	,, ..	Henry, J. ..	26.8.11	5400	,, ..	Brinicombe, S.R.	29.9.11
5192	,, ..	Turner, F. ..	26.8.11	17730	Serjt...	Wills, P. ..	30.9.11

* Supernumerary.

ARMY FORM C 344.

The following is a list of successful candidates at the examination for A.F. C 344, Certificate of Training as a Nurse, held in May, 1911.

Corps No.	Rank and Name		Station	Per-centage	Order of merit as regards number of marks awarded
18577	Serjeant	Road, F. L.	Gibraltar	·86	1
590	Private	Gilbert, F. C.	,,	·85	2
12537	Serjeant	Molloy, F.	Cork	·85	3
16266	,,	Talbot, R. S.	Malta	·84	4
2187	Private	Thomas, H.	Curragh	·84	5
1425	,,	Evamy, W.	Gibraltar	·83	6
296	,,	Wilson, F. G.	,,	·83	7
1715	,,	Rogers, H. G.	South Africa	·82	8
19021	Serjeant	Dell, A. A.	Woolwich	·81	9
13664	,,	Dunn, J. C.	,,	·81	
14445	Lce.-Corporal	Smith, W. E.	Aldershot	·81	10
728	Private	Brooks, A. T.	Woolwich	·80	11
844	,,	Johnstone, B. D.	Gibraltar	·80	12
11959	,,	Jones, A E.	Tidworth	·80	13
2264	,,	Blake, W. T. H.	,,	·80	14
1894	,,	Benjafield, H. J.	Aldershot	·79	15
1946	,,	Jane, E.	Woolwich	·79	16
1998	,,	Patrick, E.	Curragh	·78	17
10259	Srjt.-Major	Higdon, F.	South Africa	·78	18
18110	Serjeant	Gibson, R. W.	Malta	·77	19
2027	Private	Coney, E. H.	Alexandria	·77	20
1302	,,	Jack, J.	South Africa	·76	21
1644	,,	Flavell, C. W.	Malta	·76	22
19805	Lce.-Corporal	Hanrahan, J.	Hong Kong	·76	
19093	,,	Lane, A.	Cork	·76	23
84	Private	Richardson, J.	Malta	·76	
19048	Lce.-Corporal	Black, J.	Colchester	·76	24
18950	Private	Fielder, A. J.	Devonport	·76	
2064	,,	Walsh, W.	Dublin	·75	25
1094	,,	Alloway, H. B.	Malta	·75	26
2084	,,	Titchener, F S.	Aldershot	·75	27
19484	,,	Posner, W. T.	Malta	·74	28
29	,,	Hart, J.	Chatham	·74	29
11894	,,	Snow, R.	Woolwich	·74	30
2083	,,	Pearce, W. G.	Malta	·74	31
2186	,,	Jenkins, H. E.	Devonport	·73	32
11453	Serjeant	Jephs, F. S. M.	Curragh	·73	33
18411	Corporal	Richards, G. H.	Devonport	·72	34
2106	Private	Macdonald, J.	Egypt	·72	35
19135	Lce.-Corporal	Quelch, W. H.	Dover	·72	36
12768	Serjeant	Kent, T. R.	Tidworth	·71	37
1847	Corporal	Ogg, R. W.	South Africa	·71	
18898	Lce.-Corporal	Green, G. H.	York	·71	38
13004	,,	Leishman, R.	Malta	·70	39
2114	Private	Stokes, H. S.	London	·70	40
18656	Lce.-Corporal	Maywood, H. G.	Netley	·70	
2255	Private	Pool, L. F.	,,	·70	41
1975	,,	Hawkes, W.	South Africa	·70	
4308	,,	Richards, R. H.	York	·70	
17818	,,	Horsnell, J.	Woolwich	·70	42
19605	,,	Nairn, M.	Malta	·69	43
19710	,,	King, H. S.	,,	·69	44
19646	,,	Gosling, H. T. S.	,,	·69	45

ARMY FORM C 344—*continued.*

Corps No.	Rank and Name		Station	Per centage	Order of merit as regards number of marks awarde
1718	Private	McCarthy, F. B.	South Africa	·69	46
2266	,,	Mills, T. S.	London	·69	
1051	,,	Davey, W. H.	Malta	·68	47
17541	Corporal	McConn, P.	Aldershot	·67	48
11734	Serjeant	Campion, A. H. O.	Colchester	·67	49
19871	Private	Brash, R. H.	South Africa	·67	50
17898	,,	Knagg, W.	Malta	·66	51
1782	,,	Topp, S. J.	Egypt	·66	
1710	,,	Hudson, J. R.	South Africa	·66	52
2060	,,	Hoult, E.	Dublin	·66	53
1539	,,	Catlin, F. G.	Egypt	·65	54
1344	,,	Shelley, W. C.	South Africa	·65	
1369	,,	Earle, B. L.	,,	·65	55
42	,,	Harding, D. G.	,,	·64	56
19128	,,	Burr, W. G.	Colchester	·63	57
2170	,,	Tromans, W. B.	South Africa	·63	58
904	,,	Dunn, J. J.	,,	·62	59
1531	,,	Kilby, F. J.	,,	·62	60
1884	,,	Gaughan, E. S.	Netley	·60	61
19506	,,	Thorn, C. L.	South Africa	·59	62
1018	,,	Lukor, H.	,,	·57	63
18610	,,	Hassard, H. W.	Cork	*	
19806	,,	Deans, W.	Malta		
18221	,,	Bradford, G. W.	South Africa		
18340	Corporal	Rouse, J.	Cosham		
1440	Private	Johnston, G.	Egypt		
659	,,	Rousell, L. T.	South Africa		
19481	,,	Mills, A. W. V.	York		
217	,,	O'Shea, T.	South Africa		

* Examined in one subject only, in which they failed at last year's examination.

ADVANCEMENT OF PRIVATES (CORPS PAY).

The following advancements in rate of Corps Pay will take effect from October 1, 1911:—

To be Advanced to the Third Rate (at 8d.).

As Orderlies.

No.	Name	No.	Name	No.	Name
11894	Snow, R.	1785	Phillips, W. J.	2187	Thomas, H.
17208	Bailey, J.	1799	Stowe, S. A.	2213	Ward, J. J. S.
19921	Shearer, G.	1914	Dugmore, E.	2218	Snape, G.
191	Bryant, J.	2006	Bray, J E	2242	Thomson, J.
590	Gilbert, F. C.	2009	Latimer, H.	4308	Richards, R. H.
844	Johnstone, B D.	2095	Rudd, P J.	4356	Woodman, R.
1270	Marrable, F. G.	2106	Macdonald, J.		

As Clerks.

609	Day, J.	2124	Butt, W.	2278	Gillbee, J.
1509	Warren, A.	2180	Rogers, T. W. G.	4882	Summers, F. G
1772	Butler, M. A.				

To be Advanced to the Fourth Rate (at 6d.).

As Orderlies.

No.	Name	No.	Name	No.	Name
19276	Young, J. J.	4332	Jacks, R. H.	4650	Kelsey, G. P.
763	Desmond, T.	4341	McCarrey, R.	4737	Hayles, H. D.
1247	Buckland, F. E.	4362	Bruce, R.	4803	Foggin, W.
1426	Pike, A. G.	4372	Henry, J.	4836	Douglas, G.
1586	Titman, H. G.	4415	Pirrett, N M.	4842	Ricks, A. C.
2133	Letton, T. C.	4494	Morris, A. L.	4719	McGibbon, J.
2148	Ashcroft, J	4562	Wood, F. C.	4932	Moran, W.
2257	Newell, C. W.	4564	Bowern, J. W.	5107	Traves, A. E.
2245	Cripps, A. G.	4567	Hochheimer, R.		

As Clerks.

19730	Young, W. T.	1464	Fitzgerald, J.	4955	Forrest, J.
19844	Green, J.	1825	Williams, A. G.	5235	Botten, G. H.
26	Bax, F.	1903	Reynolds, A. A.	5264	Roberts, F. G.
470	Claridge, H. A.	2039	Tomson H.		

As Cooks.

18381	Grizzell, W. H	2018	Taylor, W.	5112	Gregory, E. S. H.
19629	Cox, H. W.	2224	Young, F. H.	5113	Kirk, J. L.
91	Bates, R.	4349	Main, J.	5185	Collingo, H.
1432	May, R.	4465	Mallett, A.		
1943	Ward, A.	5032	Kitley, H. A. R.		

SANITARY ORDERLIES (CORPS PAY).

The following Privates are advanced to the Fourth Rate of Corps Pay at 6d., as Sanitary Orderlies, from the dates specified:—

No.	Name	Date	No.	Name	Date
4716	Young, W.	22.4.11	4547	Lynn, G A.	20.7.11
1943	Ward, A.	24.5.11	247	Doyle, T. J.	29.7.11
4518	Quayle, J. J.	16.6.11	19151	Kerby, W.	1.8.11
17385	Thornton, W... ..	20.6.11	4805	Mitchell, J. W. ..	8.8.11
4378	Butler, J.	1.7.11	85	Evans, A. F. J. ..	14.8.11
1793	Lines, A. E.	3.7.11	5279	Millgate, E. F. ..	19.8.11
19265	Armstrong, F. ..	15.7.11	2153	Pearson, J. E. ..	20.9.11

BUGLERS.

The following boys are appointed Buglers from the dates specified:—

5011	Marsh, C. W.	15.7.11	5341	Conway. W. E.	15.7.11
5334	Halliday. W.	15.7.11	2289	Harris, H. P.	23.8.11
5335	Osborne, F. R.	15.7.11	5204	Barter, H. J. ..	18.10.11

ADVANCEMENT CORPS PAY CANCELLED.

The advancement of No. 4922, Private Elliott, E. F., to the 4th rate of Corps Pay, as a Clerk, is hereby cancelled, this man having reverted to general duty.

APPOINTMENT CANCELLED.

The appointment to Lance-Corporal of the undermentioned is hereby cancelled:—
No. 17680, Private Lenihan, T.

DISCHARGES.

4795	S.-Serjt.	Guthrie, N.	30.10.11	Having reached the age.
10116	,,	Clement, T.	27.10.11	At his own request after 18 years' service.
9162	,,	Pritchard, W.	1.11.11	Termination of second period.
8977	,,	Sallis, J.	2.11.11	,, ,, ,,
10421	Serjeant	Giachardi, T.	7.11.11	Medically unfit.
8975	Lce.-Serjt.	Burrows, A.	30.10.11	Termination of second period.
10691	,,	McNeill, A.	12.11.11	,, ,, ,,
8990	,,	Field, H. H.	11.11.11	,, ,, ,,
12619	Corporal	Keohane, M.	17.10.11	Termination of first period.
8988	,,	Watts, G. R.	11.11.11	Termination of second period.
5375	Private	Barwick, J. H.	13.10.11	Free after 12 years' service.
4950	,,	Tannock, A.	27.10.11	Medically unfit.
12635	,,	Allen, G.	22.10.11	Termination of first period.
5839	,,	Robertson, W. S.	23.10.11	Payment of £10.
12652	,,	Burrows, A. E.	26.10.11	Termination of first period.
16261	,,	Wheeler, G. R.	14.11.11	Medically unfit.
5653	,,	Dewar, J.	26 10.11	Payment of £10.
5827	,,	Gunner, C. G.	28.10.11	,, ,,
12681	,,	Plumb, G.	30.10.11	Termination of first period.
8981	,,	Pendlebury, J.	6.11.11	,, second period.
12694	,,	McCaffery, F.	6.11.11	,, first period.

TRANSFERS TO ARMY RESERVE.

19308	Pte.	Carpenter, S.	9.10.11	2116	Pte.	Hollier, W. E.	23.10.11
2066	,,	Lindop, L.	12.10.11	19353	,,	Chapple, J.	27.10.11
2061	,,	Biggs, W.	11.10.11	2110	,,	Short, E.	27 10.11
19862	,,	Tole, L. R.	11.10.11	2118	,,	Smith, P.	28.10.11
2068	,,	Barker, J. W.	12.10.11	2120	,,	Smith, A. Q.	1.11.11
2064	,,	Walsh, W.	11.10.11	2126	,,	Hardy, R. H.	3.11.11
19316	,,	Misselbrook, C. A.	13.10.11	2123	,,	Bates, S. J. P.	3.11.11
2074	,,	Bowen, C.	16.10.11	2125	,,	Freed, F.	3.11.11
2080	,,	Foote, W. R.	15.10.11	2129	,,	Galbraith, W.	4.11.11
2076	,,	Brown, W. H.	16.10.11	2122	,,	Hornby, R. T	1.11.11
2085	,,	Brooks, T.	19.10.11	2121	,,	Taylor, C.	30.10.11
2086	,,	Grimes, H.	19.10.11	2135	,,	Kellow, W.	3.11.11
2082	,,	Sower, R.	15.10.11	2128	,,	Greenwood, W. L.	4.11.11
2071	,,	Coote, R. H.	14.10.11	19376	,,	Buss, T. E.	13.11.11
2084	,,	Titchener, F. S.	18.10.11	2133	,,	Letton, T. C.	6.11.11
2088	,,	Clarke, J.	19.10.11	2136	,,	Bousfield, R.	6.11.11
2097	,,	Finlan, J. T.	20.10.11	2130	,,	Wilson, W.	4.11.11
2087	,,	Hughes, S. W.	19.10.11	2132	,,	Leeming, A.	5.11.11
2073	,,	Higgs, W.	16.10.11	2145	,,	Cox, W. R. J.	8.11.11
2077	,,	Mason, H. T.	16.10.11	2140	,,	Armstrong, J.	9.11.11
2089	,,	Wilson, G. H.	19.10.11	2137	,,	Crack, F.	8.11.11
2101	,,	Byrne, B.	22.10.11	2153	,,	Pearson, J. E.	10.11.11
2094	,,	Pearson, A.	21.10.11	2146	,,	Smith, E. A.	6.11.11
2095	,,	Rudd, P. J.	21.10.11	19626	L.-Cpl.	White, E. T.	8.11.11
19220	,,	Ward, H.	30. 9.11	19870	,,	Potter, T. H.	10.11.11
2109	,,	Reed, J.	27.10.11	2138	Pte.	O'Brien, M.	9.11.11
2104	,,	Smith, F. P.	25.10.11	2152	,,	Armstrong, T.	10.11.11
19336	,,	Barnes, A.	20.10.11	2141	,,	Gray, C.	9.11.11

TRANSFERS FROM OTHER CORPS.

17278	Serjeant ..	McLennan, J. ..	26.10.11	From Northern Nigeria.
5779	Private ..	Murphy, J... ..	2.10 11	,, 5th Dragoon Guards.
5841	,, ..	Wood, M. H. ..	16.10.11	,, Worcestershire Regt.
5842	,, ..	Moore, J. F. ..	16.10.11	,, ,, ,,
5843	,, ..	Fraser, J.	29. 9.11	,, 1st A. and S. Highlanders.
5844	,, ..	Dilks, M.	26.10.11	,, 20th Hussars.
5845	,, ..	Phipps, R.	26.10.11	,, ,, ,,

TRANSFERS TO OTHER CORPS.

10580	S.-Serjt. ..	Gibbons, A... ..	3.11.11	To Colonial Government in connection with Commission to Nyasaland for investigation of sleeping sickness.
17857	Serjeant .	Macklen, A. F .	1.11.11	,, Egyptian Army.
12589	,,	Harris, A.	31.10·11	,, 2nd London Div. Ter. Forces.
4971	Private ..	Dodson, C.	9.10 11	,, 1st Leicestershire Regt.
5604	,, ..	Iles, J. D.	23.10.11	,, 3rd Dragoon Guards.
15848	Serjeant ..	Garbett-Burbidge, A. E.	2.11.11	R.A.M.C. Ter. Forces, Ipswich.

BUGLER TO THE RANKS.

2053	Bglr.	Page, T. C. ..	7.10.11	1401	Bglr.	Baxter, E. H. ..	28.10.11

TRANSFERRED TO THE RANKS.

1353	Boy	Ashwood ..	31.10.11				

THE FOLLOWING N C.O.'s AND MEN HAVE QUALIFIED AS DISPENSERS.

10808	Corporal ..	Burden, H. S.	1848	Private ..	Martins, A. V.
12485	,, ..	Nicholas, E.	16323	Corporal ..	McKenna, W.
12557	,, ..	Harvey, P.	18433	,, ..	Shaw, J. A.
17964	,, .	Bowler, W.	12592	,, ..	Fraser, J. G.
15585	,, ..	Latter, H.	17450	,, ..	Elsey, W. J.
16756	,, ..	Brown, N. W.	997	Private ..	Corbett, T. F.
14797	,, ..	Cooke, J. E.	1375	,, ..	Shipton, H.
17409	,, ..	Kimberley, H.	935	,, ..	Griffith-Williams, H. M.
17727	,, ..	Wrigley, A.			
17714	,, ..	Robinson, A. R.	16482	Corporal ..	Leppington, W. C.
19350	Private ..	Barnes, C. J. W.	189	Private ..	Taylor, G. A.
73	,, ..	Ellard, F.	1847	Corporal ..	Ogg, R. W.
10861	Corporal ..	Cleare, G.	223	Private ..	Peake, W.
1868	Private ..	Browne, E. B.	17427	Corporal ..	Higgins, L.
1065	,, ..	Dean, A.	19827	Private ..	Baxter, J. W.
26	,, ..	Bax, F.	17699	Lce.-Corpl.	Morrall, C.
756	,, ..	Pateman, G.	1190	Private ..	Handasyde, S.
2147	,, ..	Hampson, W. C.	1713	,, ..	McCarthy, F. B.

THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

FOR QUARTERMASTER-SERJEANT.

11603	S.-Serjt. ..	Clegg, W.	11613	S.-Serjt. ..	Morris, G. R.

FOR STAFF-SERJEANT.

18233	Serjeant ..	Evans, D. C.	18216	Serjeant ..	Leggett, R. G.
9405	,, ..	Valance, C.	18032	,, ..	Burns, J. I.
17633	,, ..	Sproule, R.	13338	,, ..	Boxshall, H. S.

FOR SERJEANT.

19555	Corporal ..	Martin, P. C.	17555	Corporal ..	Kinder, M.
18490	,,	Cooper, H.	11440	Lce.-Serjt.	Farmer, A
19192	,,	Poole, F.	13085	Corporal ..	Chandler, G. V.
14334	Lce.-Serjt.	Rose, S.			

FOR CORPORAL.

17401	Private ..	Wright, H. J.	193	Private ..	Truscott, H. P.
19211	,, ..	Bowen, G.	2151	,, ..	Church, A. W.
19484	,, ..	Posner, W. T.	17208	,, ..	Bailey, J.
19574	,, ..	Howe, T.	1519	,, ..	Price, W. J.
19621	,, ..	Kite, W. E.	1975	,, ..	Hawkes, W.
1247	,, ..	Buckland, F. E.			

EMBARKATIONS FOR ABROAD.

TO SOUTH AFRICA, PER H.M.T. "SOUDAN," OCTOBER 19, 1911.

18170	Serjeant ..	Sufrin, L.	4399	Private ..	Moseley, H.
18988	Corporal ..	Haigh, R. H. T.	4946	,, ..	Hastings, A.
19192	,, ..	Poole, F.	4585	,, ..	Duncan, T.
408	Lce.-Corpl.	Kneip, O.	4511	,, ..	Kerr, R.
18689	,, ..	Appleton, C.	19680	,, ..	Davis, W.
1845	Private ..	Cook, A.	1990	,, ..	Parker, J. W.
1984	,, ..	Whelan, W.	4806	,, ..	Wood, A.
2166	,, ..	Mathias, W. T.	4777	,, ..	Bull, F.
4408	,, ..	Cherry, W.	2245	,, ..	Cripps, A. G.
2164	,, ..	Rand, O. G.	4991	,, ..	Shorten, B.

TO MAURITIUS, PER H.M.T. "SOUDAN," OCTOBER 19, 1911.

11761	S.-Serjt. ..	Walls, F S.	18838	Private ..	Ward, J. R.
18717	Serjeant ..	Hart, C. H.	18381	,, ..	Grizzell, W. H.
18728	Corporal ..	Cole, F. R.	73	,, ..	Ellard, F.
12686	,, ..	Chatfield, W. H.	18770	,, ..	Fosh, J. A.
2092	Private ..	Durrant, J.	19721	,, ..	Walsh, C. F.
18736	,, ..	Franklin, E. C.			

FROM HONG KONG TO N. CHINA, PER H.M.T. "SOMALI," OCTOBER 16, 1911.

12624	Private ..	Farrell, P.			

DISEMBARKATIONS FROM ABROAD.

FROM GIBRALTAR, PER P. & O. S.S. "EGYPT," OCTOBER 16, 1911.

10015	Sjt.-Major	Grant, A. W.			

FROM SIERRA LEONE, PER S.S. "BATHURST," OCTOBER 23, 1911.

14209	Corporal	McCune, A.	17358	Corporal	Ennor, C.

FROM NORTHERN NIGERIA, AUGUST 26, 1911.

17278	Serjt.	McLennan, J.			

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

Captain Ernest U. Bartholomew resigns his commission, dated October 21, 1911.

Lieutenant John Fraser is confirmed in his rank.

To be Lieutenants (on probation): Cadet Lance-Corporal William Farquhar McLean, from the Edinburgh University Contingent, Officers' Training Corps, dated October 8, 1911; Cadet Serjeant Charles William Chester Myles, from the Dublin University Contingent, Officers' Training Corps, dated October 21, 1911.

TERRITORIAL FORCE.

Staff.

The undermentioned officers of the Royal Army Medical Corps are appointed Staff Officers to Administrative Medical Officers of Territorial Divisions: Major Gerald T. Rawnsley, dated March 1, 1911; Major William D. Erskine, M.B., dated March 1, 1911; Lieutenant-Colonel James Will, M.B., dated April 1, 1911; Major Charles A. Young, dated April 1, 1911; Captain Dermot O. Hyde, M.B., dated April 1, 1911.

Infantry.

4th Battalion, The Cheshire Regiment.—Surgeon-Captain John B. Yeoman, M.D., resigns his commission, dated October 21, 1911.

Royal Army Medical Corps.

3rd West Lancashire Field Ambulance, Royal Army Medical Corps.—The undermentioned officers to be Captains, dated October 1, 1911: Lieutenant Augustus A. W. Merrick, F.R.C.S.(I.), Lieutenant Ernest Knight, M.B.; Lieutenant Norman S. Jeffrey, M.B.

1st London (City of London) Field Ambulance, Royal Army Medical Corps.—Lieutenant Edward L. Rowse, M.D., to be Captain, dated October 1, 1911.

2nd Welsh Field Ambulance, Royal Army Medical Corps.—Arthur Cecil Devereux, M.B., to be Lieutenant, dated July 11, 1911.

1st West Lancashire Field Ambulance, Royal Army Medical Corps.—Quartermaster and Honorary Lieutenant John W. Price resigns his commission, dated October 25, 1911.

3rd South Midland Field Ambulance, Royal Army Medical Corps.—The undermentioned officers to be Captains, dated October 1, 1911: Lieutenant James S. Mather, M.B; Lieutenant Thomas A. Green, M.D.

1st Northumbrian Field Ambulance, Royal Army Medical Corps.—Lieutenant John M. Gover to be Captain, dated October 1, 1911.

2nd Southern General Hospital, Royal Army Medical Corps.—Cadet Frederick Cecil Nichols, from the Birmingham University Contingent, Senior Division, Officers' Training Corps, to be Quartermaster, with the honorary rank of Lieutenant, dated October 25, 1911.

3rd North Midland Field Ambulance, Royal Army Medical Corps.—Lieutenant Andrew E. Hodder, M.B., to be Captain, dated March 24, 1911.

1st London (City of London) Field Ambulance, Royal Army Medical Corps.—Lieutenant Eardley L. Holland, M,D., F.R.C.S., resigns his commission, dated November 11, 1911.

1st South Midland Field Ambulance, Royal Army Medical Corps.—The undermentioned officers to be Captains, dated October 1, 1911: Lieutenant Cyril R. Lunn, M.B.; Lieutenant William M. Sturrock, M.B.; Lieutenant William McCall, M.B.

2nd South Midland Field Ambulance, Royal Army Medical Corps.—The undermentioned officers to be Captains, dated October 1, 1911: Lieutenant William A. L. Holland; Lieutenant John H. Hobling; Lieutenant Alfred A. Hingston.

Officers attached to other Units.

Lieutenant Frank W. Burn, M.B., to be Captain, dated July 3, 1911.

Captain James Andrew, M.B., resigns his commission, dated October 21, 1911.

Lieutenant Henry Robinson, M.D., from the London Mounted Brigade Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated September, 21, 1911.

Captain Thomas A. Sellar, M.B., to be Major, dated August 29, 1911.

Captain David Westwood, M.B., resigns his commission, dated October 25, 1911.

Lieutenant Frederick W. K. Tough, F.R.C.S., to be Captain, dated October 1, 1911.

Thomas Charles Hunter, M.D., to be Lieutenant, dated September 9, 1911.

Oskar Teichmann, to be Lieutenant, dated September 16, 1911.

Surgeon-Lieutenant-Colonel and Honorary Surgeon-Colonel Charles Henry Gwynn, M.D., from the 4th Battalion, The King's (Shropshire Light Infantry), to be Lieutenant-Colonel, with the honorary rank of Surgeon-Colonel, dated November 11, 1911.

The undermentioned Officers of the Royal Army Medical Corps, to be Adjutants of Schools of Instruction, Captain Hugh Herbert James Fawcett, dated October 19, 1911. Captains Farquhar McLennan, M.B.; Charles Bramhall: Richard Nason Woodley; Charles Reginald Sylvester-Bradley; Richard Brassey Hole, M B.; John Martin Maynard Crawford, F.R.C.S.(I.); Montague Frederick Grant; Henry Horace Andrews Emerson, M.B.; Roland Harley Bridges; John M. H. Conway; dated November 1, 1911.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurse: Miss M. Hale, Miss E. H. Cole.

Postings and Transfers.—Matrons: Miss M. C. S. Knox, to Hounslow, from Cork. Sisters: Miss E C. Humphreys, to Cork, as Matron, from Aldershot; Miss S. B. Lanyon, to Cosham, from Dublin; Miss C. K. E. Steel, to South Africa, from Netley; Miss G. Knowles, to Aldershot, from Dover; Miss M. E. M. Grierson, to Alexandria, from Cairo; Miss M. Pedler, to Khartoum, from Alexandria; Miss H. Hartigan, and Miss F. M. Tosh, to Cairo, from Khartoum; Miss C. W. Jones, to Potchefstroom, from Bloemfontein; Miss M. Smith, to Bloemfontein, from Potchefstroom; Miss M. L. Potter, to Dover, from Cosham. Staff Nurses: Miss A. B. Nunn, to South Africa, from Cosham; Miss E. H. Davies, to South Africa, from London; Miss M. A. W. Green, to Dover, from Cosham; Miss G. M. Bennett, to Cosham, from Dover; Miss F. E. Manfield, to Khartoum, from Cairo; Miss B. L. Cooper, to London, on appointment; Miss B. E. Smith, to Aldershot, on appointment; Miss M. Hale, to Woolwich on appointment.

Promotions.—The undermentioned Sister to be Matron: Miss R. Osborne.

Appointments Confirmed.—Miss M. E. Evans, Miss C. V. E. Thompson.

ROYAL ARMY MEDICAL COLLEGE.

EXAMINATION OF LIEUTENANTS, ROYAL ARMY MEDICAL CORPS AND INDIAN MEDICAL SERVICE, AT THE CLOSE OF THE 2ND SESSION, 1911.

Hygiene.—Written Examination. Saturday, October 21, 1911. From 10 a.m. to 1 p.m.

(1) What is the essential nature of filtration, and what relation do "rapidity of output" and "efficiency of purification" bear to each other? What are the chief points of resemblance and difference in an ordinary sand filter and a Jewell filter?

(2) What do you mean by the expression "nitrogenous equilibrium"? Give the arguments for and against a low protein diet?

(3) "The temperature of a man on the march is largely regulated by the evaporation of moisture from his body." In what way does this fact affect the question of water supply on the march. What are the two different kinds of "forced march" and how do they differ from the physiological point of view?

(4) How is the air of a room affected by the results of human respiration and which of the changes produced is the most important from the sanitary point of view? In practice what precautions would you take to ensure the freshness of air in (*a*) a barrack room and (*b*) a gymnasium?

(5) Why is inspection of the source and surroundings of a water supply of more importance than the chemical and bacteriological examination of a sample of the water? Describe in detail how the information derived from these last two elucidates that procured in the first of these methods. You may use a supposititious or actual incident to elucidate your answer.

Hygiene.—Practical Examination. Monday, October 23, 1911. From 2.30 p.m. to 5.30 p.m.

(1) Examine the sample of beer before you and report on its fitness or otherwise for issue to patients in hospital. Give your reasons for the decision at which you arrive.

(2) The milk sample is suspected to contain preservatives. Ascertain if this is the case or not, detailing your method of examination.

(3) Ascertain whether any of the common metals is present in the water before you. The water has already been concentrated by boiling.

(Full details of your working should be given.)

Pathology.—Written Examination. Monday, October 23, 1911. From 10 a.m. to 1 p.m.

(1) Describe the principal blood changes which are encountered in lymphatic and myelogenous leucocythæmia respectively.

(2) Discuss the etiology of epidemic cerebrospinal meningitis, and mention the principal morphological and cultural characteristics of the *Diplococcus intracellularis meningitidis.*

(3) Give a detailed account of the manner in which you would make a bacteriological diagnosis in a case of suspected diphtheria, and of the points of distinction between the Klebs-Loeffler bacillus and Hoffmann's bacillus.

(4) Describe the structure and mode of multiplication of trypanosomes, and summarize the chief facts bearing upon the causation and spread of sleeping sickness.

Pathology.—Practical Examination. Tuesday, October 24, 1911. From 10 a.m. to 1 p.m.

(1) Stain the unfixed blood-film labelled "A," "B," or "C," and write a short account of anything abnormal which you may have found in it. Leave your specimen for examination.

(2) Examine and report upon the bacterial suspension contained in the tube marked with your examination number. Leave two stained films, one of them a Gram specimen, beside your microscope, properly labelled.

(3) Stain the section with which you are provided so as to demonstrate the presence of Gram-staining organisms in the tissue. Mention in your paper the probable nature of the organisms you have found, and of the tissue from which the section was made. Leave your specimen in focus under your oil-immersion lens.

(4) Oral examination

Military Surgery.—Saturday, October 21, 1911. From 2.30 p.m. to 5.30 p.m.

(1) What forces act upon a rifle bullet after it leaves the muzzle of the rifle, and how do they affect its flight? (10 marks.)

(2) Describe the various forms of injury to the knee-joint caused by the small-bore bullet. Give briefly the symptoms, diagnosis, and treatment of each. (30 marks).

(3) Enumerate the symptoms and complications of a wound of the lung, giving briefly the appropriate treatment for each condition. (30 marks.)

(4) The body of a vertebra in the lower dorsal region is cleanly perforated at short range by a small-bore bullet. Describe the probable effects of such an injury upon the spinal cord, and give the symptoms, prognosis, and treatment. (30 marks.)

Tropical Medicine.—Tuesday, October 24, 1911. From 2.30 p.m. to 5.30 p.m.

(1) State briefly what you know about the infectivity of contacts, patients, and convalescents respectively in typhoid fever and in bacillary dysentery.

(2) Describe the symptoms and differential diagnosis of sprue.

(3) Give detailed directions for the treatment of a case of chronic amœbic dysentery. (*Frame your answer in the form of directions such as you would give to your patient and to his nurse respectively.*)

(4) Mention three tropical diseases of long duration in which enlargement of the spleen is a regular feature. Discuss the differential diagnosis between them.

Military Medical Administration.—Wednesday, October 25, 1911. From 10 a.m. to 1 p.m.

(1) What is the medical personnel and material of a battalion in war, and the duties assigned in action to the medical aid?

(2) What are the duties of a wardmaster in military hospitals?

(3) For what duties is a medical officer in charge of barracks responsible?

(4) What are the functions of the Army Service Corps?

(5) Of what units is a Cavalry Division composed? What is the medical aid provided for it?

PRIZE DISTRIBUTION.

The usual half-yearly distribution of prizes to the Lieutenants-on-probation, Royal Army Medical Corps and Indian Medical Service, took place in the theatre of the College, at 4 p.m., on October 25.

There was a large attendance of guests, including several distinguished members of the civilian medical profession, many past and present officers of the Royal Army Medical Corps, and the friends of the Lieutenants-on-probation.

A very satisfactory report on the work of the past session was read by the Commandant and Director of Studies (Colonel E. J. E. Risk), who then called upon General Sir Charles Egerton, G.C.B., D.S.O., to give away the prizes.

General Sir Charles Egerton, in an interesting speech referred to his experiences in India more than forty years ago, and, while paying a high tribute to the zeal and devotion of the medical officers of those days, dwelt on the enormous progress which had since been brought about in the health and efficiency of our army in India, which he attributed almost entirely to the untiring efforts of the Army Medical Service. He congratulated the young officers who were entering on a military career, and pointed out to them the enormous scope they would have for using their professional attainments to the best advantage.

A vote of thanks to Sir Charles Egerton, proposed by Surgeon-General Babtie, V.C., C.M.G., and seconded by Lieutenant-Colonel Sir William Leishman, F.R.S., was heartily received.

At the conclusion of the prize distribution Colonel Risk and the officers, Royal Army Medical Corps, London, were "At Home" in the mess.

Names of Prize Winners—19th Session.

Lieutenant E. R. Armstrong, I.M.S.: Parkes Memorial, 1st Hygiene, Bronze Medal.

Lieutenant E. R. Armstrong, I.M.S.: Fayrer Memorial, Pathology, Bronze Medal and Book.

Lieutenant H. G. Monteith, R.A.M.C.: 2nd Montefiore, 2nd Military Surgery, cheque £7.

Lieutenant E. R. Armstrong, I.M.S.: Ranald Martin, Tropical Medicine, Gold Medal.

Lieutenant E. R. Armstrong, I.M.S.: 1st Montefiore, 1st Military Surgery, Bronze Medal, and cheque £21.

Lieutenant B. H. H. Spence, R.A.M.C.: De Chaumont, 2nd Hygiene, Books bound (three).

Lieutenant E. R. Armstrong, I.M.S.: Marshall Webb, Military Medical Administration, Bronze Medal, and cheque £5.

Lieutenant E. S. Calthrop, R.A.M.C.; Tulloch Memorial, Pathology, Silver Medal.

Lieutenant E. R. Armstrong, I.M.S.: Herbert, Highest aggregate, cheque about £20.

THE LATE LADY HERBERT OF LEA.

On the occasion of the funeral of the late Lady Herbert of Lea, a wreath was sent to Westminster Cathedral on behalf of the Officers, Royal Army Medical Corps. The wreath consisted of a large cable of white chrysanthemums, Harrisi lilies and lilies of the valley, with a spray of crimson roses at the foot, and a ribbon at the top to match, with the following inscription in gold lettering: "A token of sympathy and remembrance from the Officers, Royal Army Medical Corps, November 3, 1911."

WARRANT OFFICERS AND SERJEANTS (PAST AND PRESENT) ANNUAL DINNER CLUB.

The Secretary (Mr. H. Porter, 12, Cotford Road, Thornton Heath) begs to remind the members of the above Club that the annual subscription for the year ending April, 1912, is now due, and may be paid at any time to him at the address as given above. The Secretary hopes the members will accept this notice in order to save considerable clerical labour and the Club unnecessary expense. He would also point out the great advantage it would be to himself if the work in connexion with these preliminaries could be well in hand before that of organizing the next dinner commences.

UNITED SERVICES MEDICAL SOCIETY.

The next meeting will be held at the Royal Army Medical College, on December 13, 1911, at 5 p.m. Fleet-Surgeon D. J. P. McNabb, R.N. will read a paper on "Hospital Ships and their functions."

BIRTHS.

HUDLESTON.—On September 13, 1911, at Southsea, the wife of Major W. E. Hudleston, R.A.M.C., of a son.

BROWNING.—At Farnborough, on September 27, 1911, the wife of Major G. Dansey-Browing, R.A.M.C., of a son.

O'FLAHERTY.—On November 9, at 3, Mount Edgecumbe Terrace, Stoke, Devonport, the wife of Major A. R. O'Flaherty, a son.

DEATHS.

COGAN.—At Southgate, Eckington, Derbyshire, on October 18, Surgeon-Colonel Michael Cogan, retired, Army Medical Staff, aged 71. He entered the Service as an Assistant Surgeon (Staff) on March 31, 1864; transferred to Royal Artillery, June 3, 1868; became Surgeon, Army Medical Department, on March 1, 1873; Surgeon-Major April 28, 1876; Brigade-Surgeon, December 29, 1888; Surgeon-Colonel, January 24, 1894, and retired on retired pay on January 27, 1897. His war service was: Afghan War, 1878-80. Medal.

MEADOWS.- At Saltash, Cornwall, on November 9, 1911, Surgeon Major-General Robert Wyatt Meadows, Retired, Army Medical Staff, aged 79. He entered the Service as an Assistant Surgeon, 9th Foot, on May 26, 1854; became Assistant Surgeon, Canadian Rifles, December 11, 1857; Surgeon (Staff) August 22, 1865; Surgeon, 68th Foot, October 20, 1869; Surgeon-Major, Army Medical Department, March 1, 1873; Brigade-Surgeon, November 27, 1879; Deputy Surgeon-General, February 6, 1883; Surgeon-General, October 16, 1889; and retired on retired pay on August 10, 1892. His War Service was: Crimean Campaign, 1854-6. Battle of Inkerman, siege, assault, and fall of Sevastopol. Medal with clasp; Turkish medal. Afghan War, 1879-80. Actions of Ahmed Khel and Urzoo. Mentioned in Despatches. Medal with clasp.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, *Serle Street, London, W.C., not later than the* 22nd *of the month.*

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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Major F. J. W. Porter, Lieutenant-Colonel Sir W. B. Leishman, Major L. W. Harrison, Major M. H. Babington, Major E. M. Pilcher, Lieutenant-Colonel J. B. Wilson, Captain A. J. Williamson, Major W. S. Harrison, Lieutenant-Colonel C. Birt, Captain E. L. Moss, Captain N. E. J. Harding, Surgeon-General A. F. Bradshaw, Lieutenant-Colonel O. R. A. Julian, Major P. Evans, Major C. H. Straton, Major S. L. Cummins, Colonel M. D. O'Connell, Major H. S. Roch, Lieutenant-Colonel H. E. R. James, C.B., Lieutenant-Colonel C. H. Melville, Major E. W. W. Cochrane.

The following publications have been received:—

British: *The Hospital*, *The Lancet*, *The Commonwealth Military Journal*. *The Indian Medical Gazette*, *Army and Navy Gazette*, *Guy's Hospital Gazette*, *The Australasian Medical Gazette*, *The Practitioner*, *Medical Press and Circular*, *St. Bartholomew's Hospital Journal*, *The Royal Engineers' Journal*, *The Journal of Tropical Medicine and Hygiene*, *Red Cross and Ambulance News*, *Journal of the United Service Institution of India*, *Public Health*, *The Quarterly Journal of Medicine*, *Yellow Fever Bureau Bulletin*, *The Medical Review*, *Sleeping Sickness Bureau* (List of References), *Sleeping Sickness Bureau*, *No.* 31, *Transactions of the Society of Tropical Medicine and Hygiene*, *The Indian Medical Journal*, *The Army Service Corps Journal*, *The Shield*, *The Middlesex Hospital Journal*, *St. Thomas's Hospital Gazette*, *The Journal of Meat and Milk Hygiene*, *Journal of the Royal United Service Institution*, *The Cavalry Journal*.

Foreign: *Giornale di Medicina Militare*, *United States Department of Agriculture*, *Malaria e Malattie dei Paesi Caldi*, *Revista di Sanidad Militar*, *Archiv. für Schiffs- und Tropen-Hygiene*, *Archives de Médecine et de Pharmacie Militaires*, *Le Caducée*, *Japanese Medical Journal*, *Bulletin of the Johns Hopkins Hospital*, *American Medicine*. *Annual Report of the United States Army*, *Endemic Malta Fever in Texas*, *Office International D'Hygiene Publique*, *New Orleans Medical and Surgical Journal*, *United States Naval Medical Bulletin*, *Annali di Medicina Navale e Coloniale*, *Archives de Médicine et Pharmacie Navales*, *Deutsche Militärärztliche Zeitschrift*.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

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